C21.5: 957/3

Vol. 957 Number 3

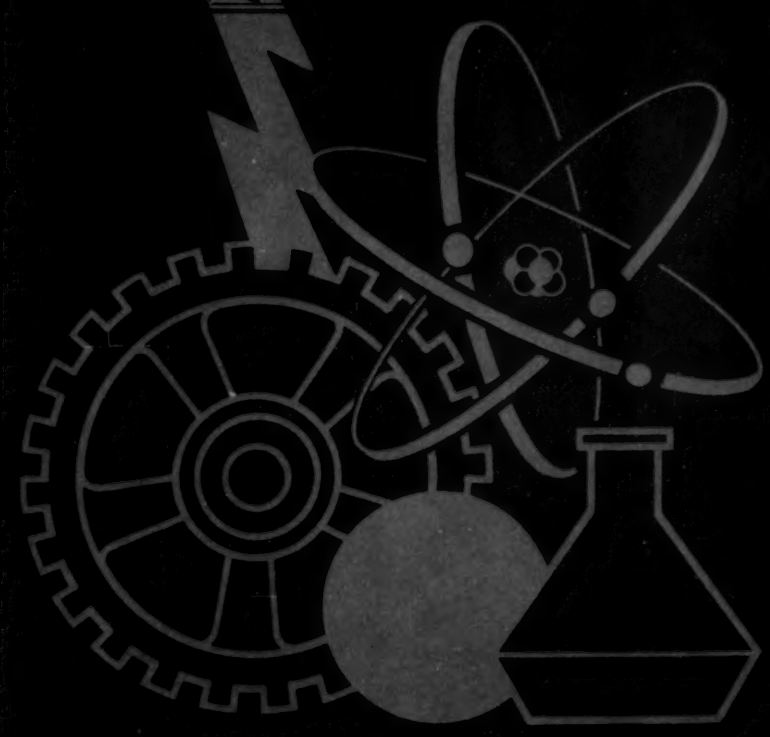
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

April 19, 1977



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

April 19, 1977 Volume 957 Number 3

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PATENT NOTICES

Certificates of Correction for the Week of Apr. 19, 1977

D. 242,774	3,982,448	3,996,318	4,002,557
3,617,166	3,983,175	3,996,412	4,002,669
3,646,343	3,983,622	3,996,531	4,002,720
3,650,196	3,984,389	3,996,559	4,002,742
3,744,898	3,984,407	3,996,621	4,002,753
3,746,568	3,984,463	3,996,658	4,002,808
3,762,105	3,984,563	3,996,673	4,002,974
3,778,242	3,984,760	3,996,760	4,003,030
3,846,479	3,985,397	3,996,795	4,003,153
3,865,742	3,985,624	3,997,022	4,003,158
3,885,912	3,986,799	3,997,432	4,003,532
3,887,624	3,987,837	3,997,493	4,003,916
3,887,903	3,988,510	3,997,500	4,003,981
3,910,153	3,988,596	3,997,880	4,004,028
3,912,030	3,989,843	3,997,896	4,004,217
3,914,517	3,989,879	3,998,015	4,004,329
3,915,686	3,989,880	3,998,044	4,004,393
3,926,521	3,990,005	3,998,508	4,004,400
3,929,802	3,990,188	3,998,643	4,004,797
3,931,623	3,991,167	3,998,865	4,004,924
3,939,248	3,991,214	3,998,932	4,005,021
3,948,631	3,991,553	3,998,992	4,005,030
3,948,639	3,991,772	3,999,246	4,005,387
3,951,946	3,992,234	3,999,372	4,005,391
3,952,036	3,992,367	3,999,549	4,005,829
3,956,774	3,992,872	3,999,605	4,005,839
3,956,871	3,993,163	4,000,261	4,005,923
3,957,744	3,993,282	4,000,295	4,005,956
3,959,071	3,993,312	4,000,479	4,006,114
3,963,575	3,993,815	4,000,565	4,006,376
3,965,187	3,993,847	4,000,611	4,006,716
3,965,328	3,994,055	4,000,672	4,006,837
3,966,315	3,994,260	4,001,227	4,007,112
3,966,478	3,994,366	4,001,305	4,007,213
3,970,178	3,994,435	4,001,324	4,007,362
3,975,632	3,994,536	4,001,413	4,007,442
3,976,207	3,994,730	4,001,479	4,007,743
3,976,673	3,994,902	4,001,972	4,008,098
3,976,796	3,994,996	4,002,211	4,008,168
3,977,794	3,995,457	4,002,303	4,008,224
3,978,009	3,995,970	4,002,384	4,008,464
3,979,329	3,996,124	4,002,474	4,008,523
3,979,936	3,996,137	4,002,477	4,008,630
3,980,757	3,996,152	4,002,515	4,009,142
3,981,844	3,996,276	4,002,526	4,009,212

Disclaimers

3,280,758.—*Wilson Leeming, James E. Knabe,* and *Richard C. Britton,* Rockford, Ill. CYLINDER BLOCK OF A HYDRAULIC UNIT AND METHOD OF MAKING SAME. Patent dated Oct. 25, 1966. Disclaimer filed Feb. 25, 1977, by the assignee, *Sundstrand Corporation.*

Hereby enters this disclaimer to claims 1, 5, 8, 10 to 12, 14 and 17 of said patent.

3,985,617.—*Yasumi Yugari,* Kamakura, and *Yoshiki Minamoto,* Chigasaki, Japan. IMMOBILIZATION OF BIOLOGICALLY ACTIVE PROTEINS WITH A POLYPEPTIDE AZIDE. Patent dated Oct. 12, 1976. Disclaimer filed Feb. 4, 1977, by the assignee, *Ajinomoto Co., Inc.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

4,011,899.—*John M. Chamberlin,* St. Louis, Mo. STEEL MEMBER FOR REINFORCING RUBBER COMPOSITIONS AND METHOD OF MAKING SAME. Patent dated Mar. 15, 1977. Disclaimer filed Feb. 24, 1977, by the assignee, *Monsanto Company.*

The term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Dedication

3,095,716.—*Richard L. Smirl,* La Grange Park, Ill. TORSIONAL VIBRATIONAL DAMPENER DEVICE. Patent dated July 2, 1963. Dedication filed Feb. 11, 1977, by the assignee, *Borg-Warner Corporation.*

Hereby dedicates the remaining term of said patent to the Public.

Erratum

All reference to Patent No. 4,015,078 to Charles E. Dawson of Florida for "Optional Prepay Coin Operated Telephone System" appearing in the OFFICIAL GAZETTE of March 29, 1977 should be deleted since no patent was granted.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 26, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	4-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-5-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-19-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	9-13-76

Expiration of patents: The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive

Plant Patents..... Numbers 1,926 to 1,948, inclusive

PATENT EXAMINING CORPS

REXE D. TECTMETER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 26, 1977

PATENT EXAMINING GROUPS

REISSUES

APRIL 19, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,184

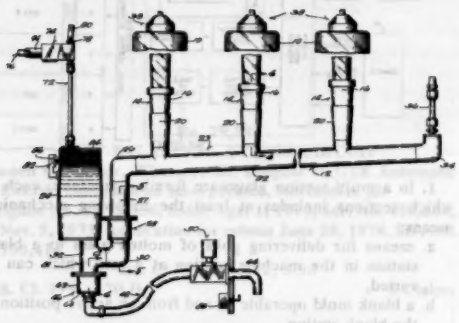
APPARATUS FOR DISPENSING LIQUID FROM A LIQUID SUPPLY MANIFOLD

John F. Petranyi, Madison, Wis., assignor to DEC International, Inc., Madison, Wis.

Original No. 3,815,792, dated June 11, 1974, Ser. No. 304,367, Nov. 7, 1972. Application for reissue May 27, 1976, Ser. No. 690,531

Int. Cl.[2] B67D *5/52*

U.S. Cl. 222—373 16 Claims



13. A liquid dispensing system comprising:

a liquid dispensing reservoir means,

a liquid supply container means in fluid communication with said reservoir means, said container means comprising a manifold assembly and a plurality of liquid containers removably connected to said manifold assembly with one end of said manifold assembly being connected to said liquid reservoir means and the other end of said assembly being connected to the atmosphere, said liquid containers being bottles which have been inverted and then connected to said manifold while in inverted position so that the fluid in said bottles will flow by gravity from said bottles into said manifold assembly and then into said liquid dispensing reservoir means, said bottles being mounted on said manifold in such a way so that the elevation of the bottle at said other end of said manifold assembly is higher than the next adjacent bottle and so on down the line of bottles to the bottle at said one end of the manifold assembly, which bottle is at an elevation lower than all the other bottles;

a check valve means interposed between said container means and said reservoir means to permit liquid flow from said container means to said reservoir means and to prevent reverse flow from said reservoir means to said container means;

a liquid dispenser outlet means in fluid communication with said liquid dispensing reservoir means;

a liquid dispenser valve means adapted to control liquid flow through said outlet means:

a source of air under pressure connected to said liquid dispensing reservoir means;

a vent means to atmosphere connected to said liquid dispensing reservoir means; and

a control valve means associated with said liquid dispensing reservoir means, said source of air under pressure and said reservoir vent means, said control valve means operative to alternately place said reservoir means into communication with said source of air under pressure and subsequently cut off said source of air under pressure and place said reservoir means into communication with the atmosphere through said vent means.

Re. 29,185

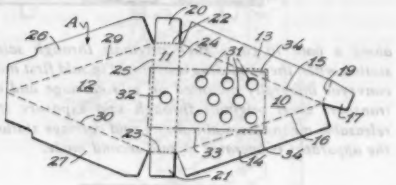
WEDGE SHAPED CARTON

William M. Tolaas, St. Paul, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Original No. 3,876,131, dated Apr. 8, 1975, Ser. No. 375,599, July 2, 1973. Application for reissue July 19, 1976, Ser. No. 706,192

Int. Cl.[2] B65D *5/18, 85/00*

U.S. Cl. 229—22 12 Claims



11. A generally triangular carton for use in containing a wedge-shaped piece of pizza or the like including:

a generally triangular bottom panel having a base edge and converging side edges,

a generally rectangular end wall hingedly connected to the base edge of said bottom panel and extending upwardly therefrom,

a generally triangular top panel hingedly connected to the upper edge of said end wall, said top panel being substantially identical in size and shape to said bottom panel, and extending parallel to said bottom panel,

inner side wall panels secured to the converging edges of said bottom panel and extending upwardly therefrom,

outer side wall panels secured to the converging edges of said top panel and extending downwardly therefrom outwardly of said inner side wall panels,

means securing said inner and outer side wall panels in face contact,

corner flaps connecting the converging ends of side walls, and connecting the ends of said end wall to said side walls,

said bottom panel having a series of spaced apertures therethrough,

a strip of film secured to the under surface of said bottom panel,

the strip of film being secured in a manner to be readily detachable to expose said apertures.

Re. 29,186

ELECTROPHOTOGRAPHIC COPYING APPARATUS OF SLIT EXPOSURE TYPE

Shigehiro Komori, Yokohama; Juro Sato, Kawasaki, and Hiroyuki Hattori, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Original No. 3,740,133, dated June 19, 1973, Ser. No. 211,383, Dec. 23, 1971. Application for reissue June 19, 1975, Ser. No. 588,227

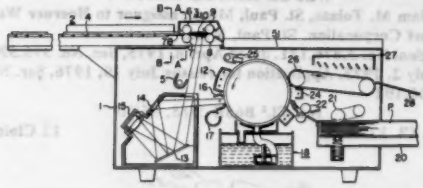
Claims priority, application Japan, Dec. 30, 1970, 45-126316

Int. Cl.[2] G03G *15/30*

U.S. Cl. 355—8 26 Claims

6. Electrophotographic copying apparatus selectively operable in a first mode for copying relatively thick originals and in a second mode for copying sheet originals comprising an exposure station through which an original to be copied is to be moved, an imaging station, an optical system for projecting an image of an original moving through said exposure station to said imaging

station, means for moving an electrically photosensitive member through said imaging station for the formation of an electrostatic latent image of said original thereon, means for transferring images from said photosensitive member to copy material, an original support carriage capable of supporting relatively thick originals, means for moving said original support carriage



along a path to carry such originals through said exposure station when the apparatus is operated in said first mode, a sheet conveyor integrally mounted on said carriage and operable to transport sheet originals through said exposure station, and releasable means for maintaining said carriage stationary when the apparatus is operated in said second mode.

Re. 29,187

COPYING APPARATUS

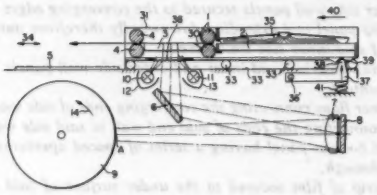
Wilhelm Knechtel, Biebertal; Gerhard Petersdorf, Pohlheim, W-Stg., and Winfried Sandner, Rechtenbach, all of Germany, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Original No. 3,741,646, dated June 26, 1973, Ser. No. 225,483, Feb. 11, 1972. Application for reissue June 25, 1975, Ser. No. 590,148

Claims priority, application Germany, Feb. 16, 1971, 2107321

Int. Cl.² G03B 27/50

U.S. Cl. 355—51 **24 Claims**



8. Photocopying apparatus selectively operable in a first mode for copying relatively thick originals and in a second mode for copying sheet originals, comprising an exposure station through which an original to be copied is to be moved, an optical system for projecting an image of an original moving through said exposure station to an imaging station, means for moving a photosensitive member through said imaging station for the formation of an image of said original thereon, a support carriage capable of supporting relatively thick originals, means for permitting said carriage to be moved along a path such as to carry such originals through said exposure station when the apparatus is operated in the first mode, a sheet conveyor operable to transport sheet originals through said exposure station while said carriage is stationary when the apparatus is operated in the second mode, said sheet conveyor being mounted in tandem with said support carriage and being movable therewith when the apparatus is operated in the first mode, and an endless flexible transmission member engaged with said sheet conveyor for transmitting drive thereto, said transmission member including a portion which extends along said path of movement of said carriage so that, during operation of the apparatus in the first mode, said transmission member remains in engagement with said sheet conveyor.

Re. 29,188

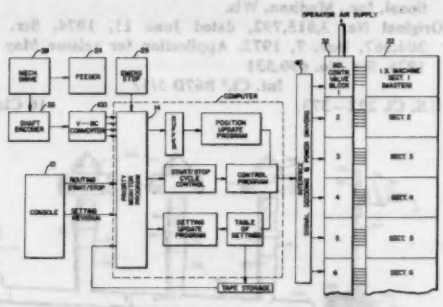
COMPUTER CONTROL FOR GLASSWARE FORMING MACHINE

William J. Croughwell, Wilmington, N.C., assignor to Emhart Industries, Inc., Hartford, Conn.

Original No. 3,905,793, dated Sept. 16, 1975, Ser. No. 516,424, Oct. 21, 1974. Application for reissue Dec. 18, 1975, Ser. No. 626,286

Int. Cl.² C03B 7/00, 9/18, 9/40

U.S. Cl. 65—163 **10 Claims**



1. In a multi-section glassware forming machine, each of which sections includes at least the following mechanical means:

a. means for delivering gobs of molten glass to a blank station in the machine section at a rate which can be varied,

b. a blank mold operable to and from an active position at the blank station,

c. a split neck ring mold operable between open and closed positions and cooperating with the blank mold to define a parison cavity at the blank station,

d. means for settling the gob into the neck mold at said blank station, and a plunger operable to and from an active position at the blank station,

e. secondary parison mold defining means operable to and from an active position at said blank station, and cooperating with said blank mold to define said parison cavity,

f. transfer means for moving said split neck molds and the parison formed in said cavity out of said blank station and into a blow station,

g. a split blow mold operable between open and closed positions at said blow station,

h. means for final forming the parison at said blow station,

i. take-out means for removing the final blown article from said blow station, said machine being further characterized by the improvement comprising:

j. drive means for said gob delivery means, and including a position indicator shaft so geared to said drive means as to make one revolution between delivery of succeeding gobs to said blank station associated with one of said individual machine sections,

k. [electromechanical transducer] means *including a shaft encoder* driven by said position indicator shaft , [for generating a variable electrical output voltage indicative of the angular position of the said shaft,]

l. [converter] *said last mentioned* means [for said transducer output voltage to generate] *generating* a coded digital signal indicative of the instantaneous position of said shaft in binary [coded decimal] form,

m. digital computer means including accessible memory means,

n. comparator means for continuously comparing said digital shaft position signal to a preprogrammed value stored in said computer memory means in order to provide a first signal when said shaft position is equal to or greater than its programmed value and providing a second signal when said shaft position is equal to or less than its programmed value,

o. said computer memory means including means for storing a programmed value of said shaft position corresponding to a desired sequence in event timing of the operation of each of said mechanical mechanisms,

p. manually operable means by which the machine operator can select other values of shaft position for certain boundary [even] *event* timings, other event timings being preprogrammed to occur at predetermined shaft displacement therefrom [, and said manually operable means being permitted only during a succeeding cycle of operation of the machine, and only when the value so selected is within a predetermined interval also preprogrammed in said digital computer means].

Re. 29,189

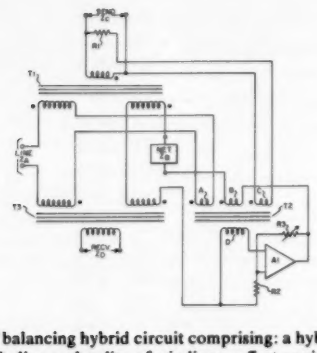
SELF-BALANCING HYBRID CIRCUIT

Russell C. Fischer, Wheaton, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Original No. 3,875,350, dated Apr. 1, 1975, Ser. No. 402,564, Nov. 5, 1973. Application for reissue June 28, 1976, Ser. No. 700,414

Int. Cl.² H04B *1/52, 3/38*

U.S. Cl. 179—170 D 3 Claims



1. A self balancing hybrid circuit comprising: a hybrid transformer including a plurality of windings; a first conjugate pair of ports comprising a first port connectible to a two-way transmission line and to *at least* a first [pair] *one* of said transformer windings and a second port connectible to a balancing network and to *at least* a second [pair] *one* of said hybrid transformer windings, a second pair of conjugate ports comprising a first port connectible to a send channel and to a third winding of said hybrid transformer and a second port connectible to a receive channel and to [a fourth winding] *at least one winding of said plurality of winding* of said hybrid transformer; sensing means including a first input circuit connection from said first port of said first conjugate pair, a second input circuit connection from said second port of said *first* conjugate pair and a third input circuit connection from said port of said second conjugate pair connected to said send channel; whereby in response to detection of an unbalanced electrical relationship between signals at said first conjugate pair of ports resulting in electrical signals in said send channel port, said sensing means are operated to insert a compensating signal into said second port of said first conjugate pair to correct error signals resulting from electrical unbalance between said first and second ports of said first conjugate pair.

Re. 29,190

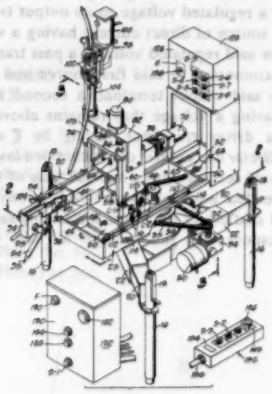
AUTOMATIC DREDGE PUMP REBUILDER

Theodore C. Braucht, Stanton, Calif., assignor to Mark K Industries, San Diego, Calif.

Original No. 3,769,486, dated Oct. 30, 1973, Ser. No. 249,342, May 1, 1972. Application for reissue July 18, 1975, Ser. No. 597,033

Int. Cl.² B23K *9/04*

U.S. Cl. 219—76 38 Claims



1. In an apparatus employing a welding device to deposit a series of contiguous weld beads on the interior wall of a hollow workpiece having coaxial upper and lower openings with the pattern of the series of the welding beads of a desired eccentricity relative to the axis of said openings,

the combination:

a base structure intersecting said axis in the region of said openings;

a horizontal guideway mounted on the base structure radially of said axis for rotation about the axis;

a carriage movable along said guideway;

a support for said welding device mounted on said carriage;

first power means on said base structure to turn the guideway about said axis;

second power means on the [base structure] *carriage* to extend and retract said support for the welding device relative to the carriage to or from the interior wall of the hollow workpiece;

third power means to raise and lower said support for the welding device relative to the carriage;

fourth power means to swing said welding device up and down in an arc relative to the support; and

means responsive to rotation of the guideway relative to the base structure to shift the carriage along the guideway in accord with the desired eccentricity of the pattern of the series of beads.

31. In an apparatus for rebuilding a workpiece by a welding torch wherein the torch makes successive traverses of an area of the workpiece with automatic stepover and automatic reversal of the direction of travel of the torch at the end of each traverse,

the improvement comprising:

means to cause the torch to pause in its travel for a predetermined time period at the end of each traverse; and

means to cut off the supply of heat to the torch during the pause;

said pause serving to permit the molten metal to cool at the end of each bead before the next succeeding bead is started and in the welding of a relatively narrow area of the workpiece preventing overheating of the narrow area.

Re. 29,191

BASE REACH-THROUGH ACTIVE SERIES VOLTAGE REGULATOR

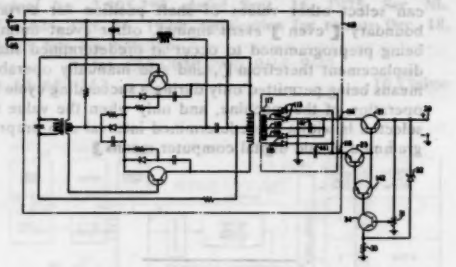
Thomas George Harrigan, Denville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original No. 3,652,919, dated Mar. 28, 1972, Ser. No. 129,349, Mar. 30, 1971. Application for reissue Apr. 15, 1975, Ser. No. 568,293

Int. Cl.² H02M 7/217

U.S. Cl. 321—18 5 Claims

1. A direct current voltage regulator for providing *a load current at* a regulated voltage to an output terminal comprising a first source of direct current having a voltage that may drop below said regulated voltage, a pass transistor having its collector connected to said first source and its emitter connected to said output terminal, a second source of direct current having a voltage that remains above said regulated voltage, a driver transistor having its [collector-emitter path] *collector and emitter* connected *in a low impedance path* between said second source and the base of said pass transistor, and feedback means connected between said output terminal and said driver transistor for driving said driver transistor in response to the voltage at said output terminal [whereby during periods when said first source voltage is below said regulated voltage], said driver transistor [supplies] *operating to supply said load* current *at said regulated voltage* to said output terminal through the base-emitter junction of said pass transistor [to maintain] *during periods when said first source voltage is lower than* said regulated voltage.



PLANT PATENTS

GRANTED APRIL 19, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,042

NECTARINE TREE

John J. Kovacevich, P.O. Bin 488, Arvin, Calif. 93203

Filed May 28, 1976, Ser. No. 690,972

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—41 **1 Claim**

1. A new and distinct variety of nectarine tree, substantially as illustrated and described, which is generally similar in tree and fruit to the Sunrise Nectarine Tree of U.S. Plant Pat. No. 1,256, of which it is a sport, but which bears fruit which ripens from 10 days to 2 weeks earlier than the Sunrise, approximately at the same time as the Armking of U.S. Plant Pat. No. 2,943 and 7 to 10 days after the Mayred of U.S. Plant Pat. No. 2,758.

PATENTS

GRANTED APRIL 19, 1977

ERRATA

For CLASS	See PATENT NO.
098–040 VM	4,018,159
098–040 D	4,018,160
110–038	4,018,168
223–078	4,018,382
273–035 B	4,018,436
428–678	4,018,569
152–359	4,018,570
250–511	4,018,716
428–425	4,018,850
106–057	4,018,858
426–021	4,018,898
426–055	4,018,899
426–072	4,018,900
426–075	4,018,902
426–104	4,018,903
426–115	4,018,904
426–124	4,018,905
426–237	4,018,906
426–250	4,018,907
426–281	4,018,908
426–532	4,018,909
426–537	4,018,910
358–128	4,018,984
358–285	4,018,985
358–142	4,018,986
358–128	4,018,987
358–164	4,018,988
235–105	4,019,030
235–131 FD	4,019,031
250–543	4,019,064
361–220	4,019,094
361–079	4,019,095
361–086	4,019,096
361–093	4,019,097
361–385	4,019,098
361–399	4,019,099
361–186	4,019,100
361–313	4,019,101
361–225	4,019,102

PATENTS

GRANTED APRIL 19, 1977

ERRATA

See CLASS	See PATENT NO.
098-040 VM	4,018,159
098-040 D	4,018,160
110-038	4,018,161
223-078	4,018,162
273-035 R	4,018,456
428-978	4,018,569
152-359	4,018,570
250-211	4,018,716
428-425	4,018,850
106-037	4,018,858
426-021	4,018,898
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426-072	4,018,900
426-075	4,018,902
426-104	4,018,903
426-115	4,018,904
426-124	4,018,905
426-227	4,018,906
426-250	4,018,907
426-281	4,018,908
426-332	4,018,909
426-327	4,018,910
358-128	4,018,984
358-285	4,018,985
358-142	4,018,986
358-128	4,018,987
358-164	4,018,988
235-105	4,019,020
235-131 FD	4,019,031
250-543	4,019,064
361-220	4,019,094
361-079	4,019,095
361-086	4,019,096
361-093	4,019,097
361-385	4,019,098
361-399	4,019,099
361-186	4,019,100
361-313	4,019,101
361-225	4,019,102

PATENTS

GRANTED APRIL 19, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

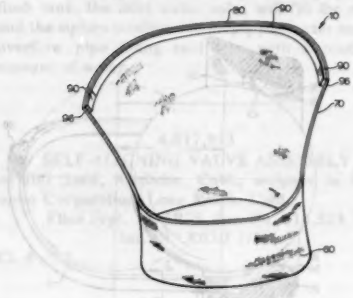
GENERAL AND MECHANICAL

4,017,906

PROTECTIVE GARMENT FOR THE FACE

Frank J. Bochynsky, Highland Park, and George J. Przybylek, Martinsville, both of N.J., assignors to The Byke Co., Highland Park, N.J.

Filed May 28, 1975, Ser. No. 570,003
Int. Cl.² A42B *3/00*
U.S. Cl. 2—10 **7 Claims**



1. A cold weather garment comprising

a first relatively wide collar portion to be worn on and surrounding the neck and shaped to cover the neck of an individual for providing warming muffler action therefor, said collar portion having a lower edge and an upper edge, said collar portion being made of fabric,

a second portion made of a stretchable fabric and comprising a flap, said flap having a lower edge which is secured to a portion of the upper edge of said first collar portion, said flap thus being adapted to be raised and lowered with respect to said first collar portion, said flap having an inner surface and an outer surface,

said flap being generally rectangular in shape and having an upper edge spaced from its lower edge and from said first collar portion, said flap being extendible from side collar portion so that said upper edge of said flap can engage the outer surface of the face shield of a helmet worn by the individual whereby said flap blocks the open space between the face of the individual and the face shield of the helmet and prevents excessive wind from entering said space, the upper edge of said flap portion having a first end and a second end spaced apart from each other,

a length of elastic secured to said upper edge of said flap portion and extending along substantially the entire length of said upper edge from said first end to said second end, the upper edge of said flap and said elastic being adapted to be stretched and placed in tension, and

fastening means secured to the inner surface of said first and second ends of the upper edge of said flap portion, said fastening means being adapted to be secured to spaced-apart portions of the outer surface of the face shield of a helmet worn by the individual with said elastic and the upper edge of said flap stretched and in tension,

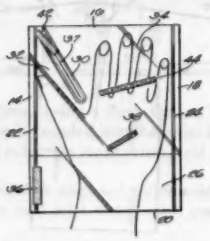
the attachment of said first and second ends of said upper edge of said flap to the spaced-apart portions of the outer surface of said face shield permitting the remainder of said upper edge of said flap either to be stretched and placed in engagement with the outer surface of the face shield or removed from engagement with the outer surface of the face shield.

4,017,907

SANITARY HAND COVERING WITH SHAPING FASTENERS

Hyman J. Margolis, 3036 N. 45th St., Milwaukee, Wis. 53210

Filed Mar. 3, 1976, Ser. No. 663,322
Int. Cl.² A41D *19/00*
U.S. Cl. 2—158 **6 Claims**



1. In a rectangular sanitary hand covering made by two adjacent sheets of plastic film material having three closed sides and one open side surrounding a central portion, a divider portion of said sheets being sealed together around an opening that does not intersect any side to divide the interior thereof into a thumb stall and a finger stall, the improvement comprising at least one pair of fasteners affixed to the outer surface of one sheet, one of said fasteners being positioned adjacent to the junction of said open side and one closed side of said hand covering, and the other fastener being positioned in the central portion of the outer surface of the same sheet in position to interact with the first mentioned fastener in closing the slack portion around the open side of said hand covering when it is on a person's hand to prevent the hand covering from falling off the person's hand.

4,017,908

RESCUE GARMENT

Edward L. Murnane, 3327 La Mesa Drive No. 3, San Carlos, Calif. 94070

Filed Nov. 3, 1975, Ser. No. 628,351
Int. Cl.² A41D *9/00*
U.S. Cl. 2—84 **4 Claims**

1. In combination with a rescue/survival garment having at least a neck portion:

a. means defining a stowage pocket in said garment, said pocket having an opening around said neck portion,

b. head covering means stowed in said stowage pocket,

c. a visor on said head covering means, at least a portion of said visor extending out of said stowage pocket when said head covering means is stowed therein to define a collar-like tab constituting a collar of said garment and by which

said head covering means is extractable from said stowage pocket for use, and

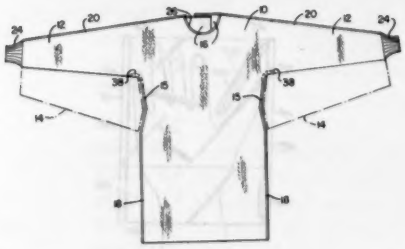
d. radar-reflective/high visibility means associated with said head covering means.

4,017,909

DISPOSABLE OPERATING ROOM GOWN

Robert Brandriff, 19472 Country Club Drive, Tequesta, Fla. 33458

Filed Oct. 3, 1975, Ser. No. 619,248
Int. Cl.² A41D *13/00*
U.S. Cl. 2—114 15 Claims



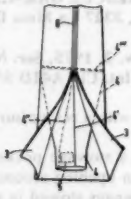
1. A surgical gown, comprising a front panel formed of a single section of material, two sleeves with the front portion of each one integral with the front panel so that no seams are located at the front of the gown, each sleeve being formed of said single section of material which is folded and joined by a seam located along the upper edge of the sleeve so that no seams are located in the front or bottom portions thereof, the gown further including a back portion joined to the front panel and sleeves.

4,017,910

TROUSERS FOR COMBINED TRAINING AND LEISURE SUIT

Alfred Bente, Herzogenaurach, Germany, assignor to Messrs. adidas Sportschuhfabriken Adi Dassler K.G., Germany

Filed Feb. 9, 1976, Ser. No. 656,409
Claims priority, application Germany, Mar. 5, 1975, 2509449
Int. Cl.² A41D *1/08*
U.S. Cl. 2—232 5 Claims



1. Trousers for a combined training suit and leisure suit which comprises:

a pair of trouser legs, each of said trouser legs having a substantially vertically extending slit extending upwardly a distance from a lower end thereof;

an operable fastener adapted to close said substantially vertically extending slit of each of said trouser legs;

a gaiter positioned within each of said trouser legs proximate to said vertically extending slit of each of said trouser legs, said gaiter being fixed to said trouser legs a short distance below a knee region of said trouser legs and extending downwardly to a location below a calf region of said trouser legs, said gaiter being formed of overlapping portions; when wrapped around the circumference of the wearer's leg. and

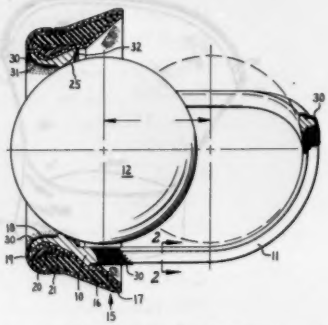
a touch and close fastener means disposed on said overlapping portions of said gaiter to permit variable width adjustment of said gaiter.

4,017,911

HEART VALVE WITH A SINTERED POROUS SURFACE

Ralph R. Kafesjian, Irvine; Norman G. Masse, Newport Beach, and David P. Keller, Mission Viejo, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Continuation of Ser. No. 473,748, May 28, 1974, abandoned. This application June 3, 1976, Ser. No. 692,428
Int. Cl.² A61F *1/22*
U.S. Cl. 3—1.5 4 Claims



1. A heart valve having a metal orifice ring and cage struts confining a movable valve member, said valve member in closed position seating on a contact area of said orifice ring and in moving between closed and open positions engaging contact areas on said cage struts, said orifice ring and cage struts having surfaces exposed to a blood stream flowing through the valve and subject to the growth of connective tissue on said surfaces and a porous metal coating of controlled porosity and thickness sintered on said exposed metal surfaces other than said valve member contact areas to promote the ingrowth of said tissue so as to anchor the tissue to the metal in selected areas and prevent said tissue from breaking off and entering the blood stream, said coating comprising substantially a monolayer of sinterable metal particles of substantially uniform size and shape adhered to said selected areas and sintered on said selected areas, said particles being bonded to said arifice ring and cage struts and to each other without gross deformation of the particles so as to leave intercommunicating openings around the particles for said ingrowth of tissue.

4,017,912

METERABLE WATER CLOSET

Daniel J. Young, Sr., 3137 Capri Road, Lake Park, Fla. 33410

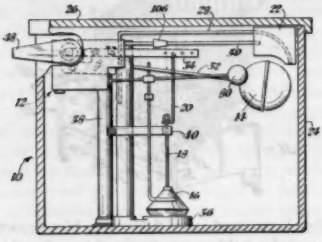
Filed Nov. 5, 1975, Ser. No. 629,144
Int. Cl.² A47K *17/00*
U.S. Cl. 4—1 4 Claims

1. In a water closet having a trap, a flush tank, a water inlet

valve, an overflow pipe coupled into the toilet bowl, a flush bowl and a flush bowl actuating mechanism, a device for conserving the amount of water received in said trap comprising:

a trap fill meter tank disposed within said flush tank;

a conduit from said inlet water valve connected into said meter tank;



a siphon tube disposed with one end in said meter tank and the opposite end disposed in said overflow pipe, said siphon tube being positioned below the uppermost level in the meter tank when filled and said meter tank having an open top whereby during the flushing operation of the flush tank, the inlet water valve will fill the meter tank and the siphon conduit will empty the meter tank into the overflow pipe filling said trap with a predetermined amount of water.

4,017,913

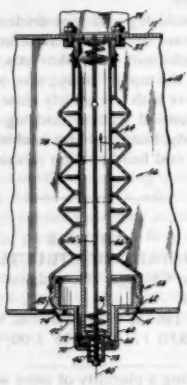
SELF-ALIGNING VALVE ASSEMBLY

Ronald Iliff Judd, Anaheim, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Sept. 18, 1975, Ser. No. 614,529

Int. Cl.² E03D *1/34*

U.S. Cl. 4—52 **4 Claims**



1. A valve assembly for use inside of an enclosed container comprising:

a support structure capable of being mounted on the inside of the container opposite of an annulus defining a drain hole, said drain hole having an inlet side and an outlet side;

telescoping alignment tubes engaging said structure;

a spherical ring member engaging said tubes on the end opposite said support structure to provide a spherical joint, said spherical joint having a center of rotation and a spherical contact surface;

a circular valve plug with spherical sealing surface attached to said ring member;

a compressible helical spring in axial alignment with said telescoping tubes to urge said plug into said drain hole;

the location of said contact surface between the spherical ring member and telescoping alignment tubes and the location of the center of rotation of said spherical joint being on the outside of said drain hole when said plug has engaged said annulus.

4,017,914

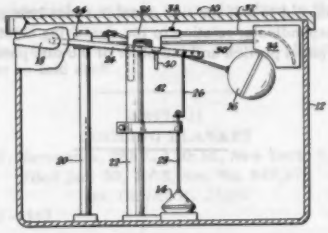
WATER CLOSET METERING DEVICE

Daniel J. Young, Sr., 3137 Capri Road, Lake Park, Fla. 33410

Continuation-in-part of Ser. No. 629,144, Nov. 5, 1975. This application June 18, 1976, Ser. No. 697,359

Int. Cl.² E03D *1/34, 5/02;* **A61B** *19/00*

U.S. Cl. 4—67 A **2 Claims**



1. A water closet having a flush tank, a water inlet valve, and overflow pipe is coupled into the toilet bowl, a flush bowl and a flush bowl actuating mechanism, said flush tank including:

a trap fill meter tank disposed within said flush tank;

a conduit from said inlet water valve connected into said meter tank;

a siphon tube disposed with one end in said reserve tank and the opposite end disposed in said overflow pipe, said siphon tube being positioned below the uppermost level of the water in the meter tank when filled and said receptacle having an open top whereby during the flushing operation of the flush tank, the inlet water valve will fill the meter tank and the siphon conduit will empty the meter tank into the overflow pipe and toilet trap; and

an adjustable valve connected to said siphon tube between said fill meter tank and said overflow pipe for adjusting the rate of flow from the meter tank into the overflow pipe.

4,017,915

FOLDING BASIN

Era Pauline Prewitt, Rte. No. 1, Grandview, Tex. 76050

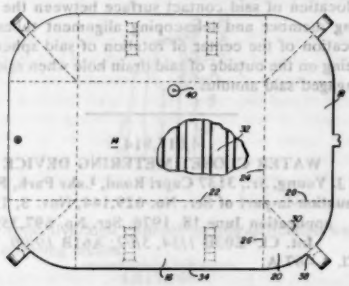
Filed Aug. 29, 1975, Ser. No. 609,098

Int. Cl.² A47K *3/062*

U.S. Cl. 4—177 R **4 Claims**

1. A foldable liquid retaining basin comprising a sheet of liquid impervious flexible material having a bottom panel portion bordered by peripheral side panel portion interconnected by foldable flap portions, said side panel portions being connected along folds to the bottom panel portion and foldable to erect positions relative to the bottom panel portions, a plurality of parallel spaced rigidifying slat elements secured to each of the bottom and side panel portions forming a plurality of foldlines therebetween, two of the side panel portions spaced from each other and extending transversely of the rigidifying elements when folded onto the bottom panel portion being foldable with the bottom panel portion along said foldlines into a compact form, the slat elements secured to said two of the side panel portions and the bottom panel portion, respectively, being separated from each other along

the folds between said two of the side panel portions and the bottom panel portion, and fastener means for holding the side panel portions in said erect positions with the rigidifying elements on said two of the side panel portions being in substantially perpendicular relation to the rigidifying elements on the bottom panel portion and the other of the side panel portions.



4,017,916

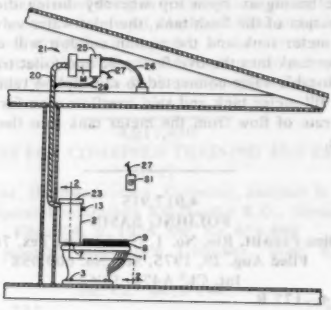
TOILET VENTILATOR INCLUDING MOTION-RESPONSIVE ELECTRICAL TRANSDUCER

Raymond H. Pearson, 627 Sherwood Drive, Richardson, Tex. 75080

Continuation-in-part of Ser. No. 540,538, Jan. 13, 1975, Pat. No. 3,942,400, which is a continuation-in-part of Ser. No. 496,954, Aug. 13, 1974, Pat. No. 3,939,506. This application Dec. 4, 1975, Ser. No. 637,646

Int. Cl.² E03D 9/04; A47K 13/00

U.S. Cl. 4—213 **2 Claims**



1. A deodorizing accessary for water closets, said water closet including a toilet bowl and water tank, said water tank including a flushing mechanism having an external operating appendage disposed on the outside of said water tank, said accessary comprising electric air blower means suitably communicative with said water closet so as to remove odorous air from said toilet bowl, and control means, said control means including switching means operable to initiate said air blower means, said control means also including electrical transducer means responsive to the motion of said flushing mechanism, said electrical transducer means having at least one parameter which is a function of said motion, whereby said air blower means may be terminated in response to the motion of said flushing mechanism when said water closet is flushed.

4,017,917

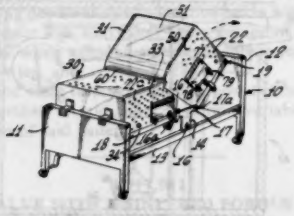
COVER

Murray Hunter Brown, Santa Monica, Calif., assignor to John R. Puckett, Pacific Palisades, Calif., a part interest

Filed Mar. 3, 1976, Ser. No. 663,367

Int. Cl.² A47C 19/22

U.S. Cl. 5—60 **1 Claim**



1. A security enclosure for a patient in a hospital bed of the type having a mattress support frame with head and foot ends and a transverse pivot joint in an intermediate location thereof, dividing said frame into normally horizontally outstretched head and foot portions, said head portion being adjustable between a horizontal lying position and a range of angularly up-tilted sitting positions, comprising:

two relatively rigid patient enclosure shells articulated for pivotal movement relative to one another on a pivot axis substantially coinciding with said transverse pivot joint of said mattress support frame, one of said shells comprising a leg and foot enclosure, and the other of said shells an upper body, arm and head enclosure, with the first adapted for mounting on said foot portion of said support frame, and the second on said head portion thereof,

said shells being formed to substantially confine a patient throughout a range of relative positions of said head portion of said bed frame from horizontal to an up-tilted sitting position,

said shells having side wall portions adapted to partially and relatively closely overlap one another on each side throughout said pivotal movement of said shells relatively to one another,

a top wall for said leg and foot enclosure, formed with a convex rearward extension wall struck on an arc whose center coincides with said pivot axis, and

a top wall for the upper body, arm and head enclosure shaped to move with a relatively close fit over said convex rearward extension wall of said leg and foot enclosure when said body, head and arm enclosure swings pivotally upward with said head portion of said bed frame.

4,017,918

METAL CRIB STRUCTURE

George M. Harris, Chicago, Ill., assignor to Harris-Hub Co., Inc., Harvey, Ill.

Filed Jan. 8, 1976, Ser. No. 647,576

Int. Cl.² E03D 11/10; A47F 3/00; F16M 11/20

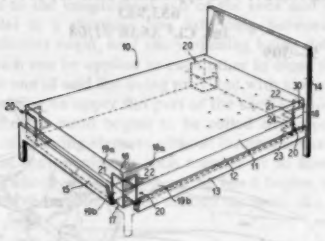
U.S. Cl. 5—100 **8 Claims**

1. In a crib having a plurality of sides with at least one side including upper and lower circular horizontal metal rods and a plurality of spaced hollow vertical metal rods with interconnecting means between said horizontal and vertical rods, the improvement of said interconnecting means including a plurality of inserts respectively received into opposite ends of said vertical rods, each of said inserts having opposite ends, one of said ends having a size corresponding to the internal dimension of said vertical rods to be received therein, each of said inserts having an enlarged portion engaging an end of a vertical rod, the opposite end of each insert having a concave arcuate surface corresponding in configuration to the periphery of said horizontal rods and a projection extending from

said concave surface, said upper and lower horizontal rods having openings receiving said projections, and connecting

means between said upper and lower horizontal rods for maintaining said rods and inserts in assembled relation.

4,017,919
MATTRESS GUARD
John H. Hemmeter, 128 Sterling Lane, Wilmette, Ill. 60091
Filed Feb. 12, 1976, Ser. No. 657,493
Int. Cl.² A47C *22/00*
U.S. Cl. 5—317 R 6 Claims



1. A mattress guard for aligning a mattress with a box spring thereunder, each of said mattress and box spring having vertical sides and corners, and said box spring having at least two edges resting upon a support thereunder, the guard comprising:

a horizontal portion adapted to be captured between said box spring and said support thereof at one of said corners of said box spring,

said horizontal portion extending beneath said box spring from a first side to a second, adjacent side thereof; and

a pair of vertical portions secured at lower ends thereof to said horizontal portion at said first and second sides of said box spring, each of said vertical portions extending upwardly to ends adjacent said sides of the mattress,

whereby said guard prevents said mattress from slipping outwardly past either of said first and second sides of said box spring at said corner.

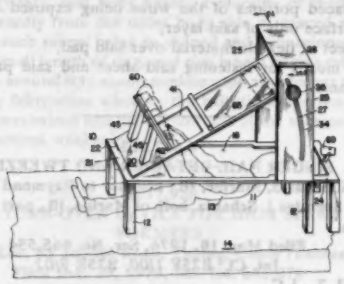
4,017,920
BED DESK
Robert C. Sieg, Shanghai, Va., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed July 26, 1976, Ser. No. 708,325
Int. Cl.² A47C *21/00*; A61G *7/02*
U.S. Cl. 5—317 R 3 Claims

1. A desk assembly adaptable for mounting on a bed above a reclining invalid comprising

an open frame fitted with legs,

a panel hinged to a foot end of the panel and supported at an adjustable height above the opposed head end of the frame by support members extending above the head end of the frame,

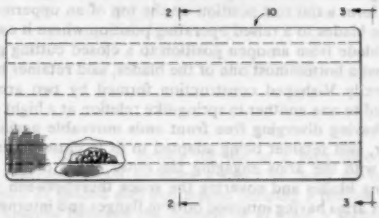
said panel fitted with an opening, and a shelf extending



alongside said opening in an angular plane to the plane of the panel,

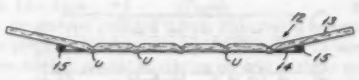
said shelf fitted with detachable means to fasten a typewriter to said shelf.

4,017,921
COOLING BLANKET
Carmen T. Hernandez, 201 E. 17th St., New York, N.Y. 10003
Filed Jan. 30, 1975, Ser. No. 545,578
Int. Cl.² A47G *23/00*
U.S. Cl. 5—347 1 Claim



1. A blanket adapted to receive ice; said blanket comprising : a pair of elongated sheets of water impervious material; said sheets being substantially congruent and being disposed adjoining each other as layers, said sheets being sealably adhered to each other along a plurality of spaced apart parallel elongated strip regions running the length of said sheets in a manner that a plurality of parallel elongated chambers between said sheets and running the length of said sheets are defined in alternating relationship with said elongated strip regions; a plurality of zipper closure members respectively located at one end of said plurality of chambers for allowing said chambers to be filled with ice; and a facing material permanently adhered over said sheets.

4,017,922
FURNITURE DECK CONSTRUCTION
Henry J. Tischler, Bloomfield Hills, Mich., assignor to Gulf & Western Metals Forming Company, Southfield, Mich.
Filed Nov. 24, 1975, Ser. No. 634,414
Int. Cl.² A47C *23/00*
U.S. Cl. 5—354 13 Claims



1. In a furniture construction, the combination comprising

a frame,

a plurality of sinuous springs fastened to the frame,

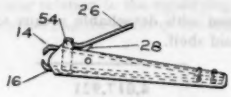
a composite pad overlying said springs,

said pad comprising a layer of relatively thick, flexible, compressible material,
and a plurality of transversely spaced longitudinally extendng wires woven therethrough with longitudinally spaced portions of the wires being exposed along one surface only of said layer,
a sheet of flexible material over said pad,
and means for fastening said sheet and said pad to said frame.

4,017,923
FINGER NAIL RETAINER AND TWEEZER

John S. Schantz, Marine, Ill., assignor to Raymond G. Shantz and Socrates J. Schantz, both of Marine, Ill., part interest to each

Filed Mar. 10, 1976, Ser. No. 665,554
Int. Cl.² B25F *1/00*; B25B *9/02*
U.S. Cl. 7—1 C 4 Claims

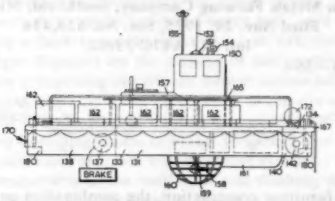


1. A nail clipping retainer and tweezer for use with a nail clipper having a pair of elongated cutting blades fastened together at a rear end and spaced apart at a forward end by spring action and having a retractable operating lever moveable form a flat rest position on the top of an uppermost one of the blades to a raised operating position where it can force said blade from an open position to a closed cutting position against a bottommost one of the blades, said retainer being of generally V-shaped construction formed by two arms connected to one another in spring-like relation at a bight portion and having diverging free front ends moveable against each other, said retainer being adapted to fit in close biasing relation with the arms engaging the outer edges of the pair of cutting blades and covering the space therebetween said retainer arms having inturned bottom flanges and inturned guide elements spaced above the flanges to receive the opposed sides of the bottommost cutter blade therebetween, said retainer when removed from the cutter being manually operable to cause the front ends of said arms to be forced together for use as a tweezer.

4,017,924
LIFE SAVING EQUIPMENT FOR VESSELS

William York Higgs, Gibsons, Canada, assignor to Intercontinental Marine Limited, Vancouver, Canada

Division of Ser. No. 471,964, May 21, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,787
Claims priority, application United Kingdom, May 21, 1973, 24113/73
Int. Cl.² B63C *9/02*
U.S. Cl. 9—14 18 Claims

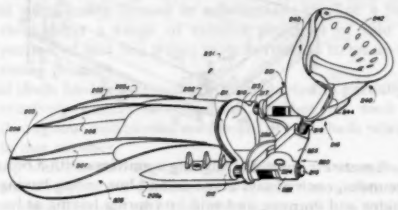


1. Lifesaving apparatus for vessels comprising a buoy suitable for being carried by a vessel in a manner permitting easy launching of the buoy should the vessel sink, said buoy including a buoyant body and a cable reel rotatably mounted on the buoy and carrying a cable of adequate strength to act as an anchor cable, said cable being suitable for connection with the vessel so as to maintain connection between the floating buoy and the vessel after the vessel has sunk, wherein said buoy includes a deck area suitable for accommodating at least one crew member and several passengers and having a configuration which provides a stable loading deck to receive passengers from the vessel and to allow the passengers to enter life rafts held close to the buoy, and also accommodates a plurality of inflatable life rafts together with pressurized gas containers for inflating the rafts said rafts having a combined capacity greatly in excess of the number of persons that can be carried on the buoy itself, said rafts being contained in canisters releasably held on said deck, said buoy including a mooring line normally stowed on a reel carried by the buoy but releasable therefrom under the control of a crew member after the buoy has been released from the vessel, said mooring line being capable of holding said plurality of life rafts when inflated and floating on the water and when carrying passengers.

4,017,925
SWIM FIN INCLUDING MEANS FOR RESTRICTING ANKLE MOVEMENT

Ralph B. Shamlian, San Francisco, Calif., assignor to Farallon Industries, Inc., Belmont, Calif.

Continuation-in-part of Ser. No. 540,908, Jan. 14, 1975, Pat. No. 3,978,537. This application Jan. 30, 1976, Ser. No. 653,943
Int. Cl.² A63B *31/08*
U.S. Cl. 9—309 20 Claims



1. In a swim fin having a foot pocket, the improvement comprising:
a tubular assembly having a free end extending from a pair of opposite sides of said foot pocket;
a cuff member fitted to said free end for engaging a lower rear portion of a leg;
a heel strap coupled to said tubular assembly; and
means for adjusting the position of said cuff member and said heel strap relative to said foot pocket to accommodate different sized feet.

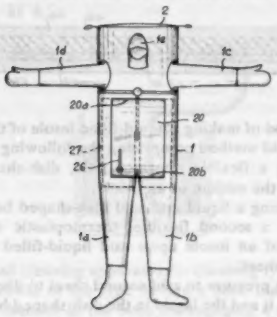
4,017,926
LIFE-SAVING GARMENT

Michel Piel, Etampes, France, assignor to Societe Industrielles des Etablissements Piel, Etampes, France

Filed July 14, 1975, Ser. No. 595,794
Int. Cl.² B63C *9/12*
U.S. Cl. 9—331 14 Claims

1. A life-saving garment for a person in water, including a front portion adapted to be worn on the person's chest, and an inflatable pocket of substantially rectangular shape located on the exterior of said front portion, said pocket being secured to said front portion of the garment at an upper edge of said pocket, which edge defines the hinge axis of said pocket, the pocket being swingable about an axis substantially parallel to the line of the person's shoulders and located below the arm-

pits, said garment being made of flexible, water-proof, thermally insulating material and including legs, sleeves and a hood, the garment having the general form of a capacious sack which includes said front portion and extends along a longitudinal axis from a lower end, which is shaped to define the legs, to an upper end, which is completely open and which comprises the entry opening permitting entry into and out from the sack, said longitudinal axis passing through a medium zone where the sack is provided with exterior pockets which merge with the sack, two of said projecting pockets forming the sleeves and one the hood, said open end of the sack defining,



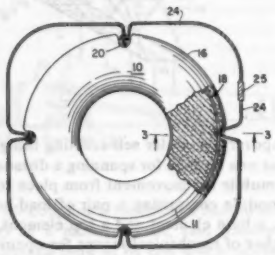
when the garment is laid flat, a straight line substantially at right angles to the longitudinal axis of the sack and substantially parallel to a shoulder line extending between points where the sleeves begin, said entry opening being defined by two lips which can be applied to each other to close the sack, with at least one of said lips being provided with a reinforming element enabling an upper flat part of the sack located above a zone where the hood begins to be rolled over upon itself around the reinforcing element without forming creases along the length of the opening in such manner as to form a roll immediately above said zone where the hood begins, said roll being adapted then to be looped around the neck of a wearer.

4,017,927

RING BUOY

David H. Massey, 139 Hawthorne, Glencoe, Ill. 60022

Filed Jan. 22, 1976, Ser. No. 651,421
Int. Cl.² B63C *9/10*
U.S. Cl. 9—340 **7 Claims**



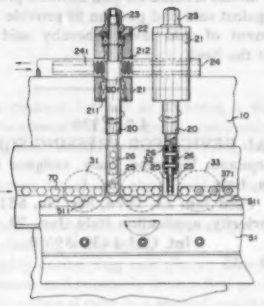
1. A ring buoy having a generally toroidalshaped body substantially of plastic foam material having great buoyancy, said body when horizontally viewed showing in plan two concentric circles defining respectively the inner and outer body sides and the circle center defining the straight axis of the toroid body, the annular region between the concentric circles comprising the top face of the body, a transverse section of the ring body in a plane containing the straight toroid axis having a rounded shape, said body also having a bottom face, said body having a tough adherent plastic coating thereover, a metal ring in the body symmetrically between the top and bottom body faces and symmetrically within the outer body side and substantially closer to the outer body side than to the inner body side, said body having a plurality of shallow recesses inwardly from the outer body side at spaced angular intervals, each recess being so shaped and dimensioned as to expose a small length of ring, said ring length having sufficient free space around it to accommodate rope attachment thereto after buoy fabrication whereby the ballistic properties of the buoy are maximized and the shallowness of the recesses minimizes structural weakening.

4,017,928

BLANK TURN-OVER DEVICE FOR HIGH SPEED NUT FORMERS

Yuan Ho Lee, 85 Jen Ho Road, Tainan, China /Taiwan

Filed Dec. 29, 1975, Ser. No. 645,078
Int. Cl.² B21K *1/64, 27/00*; B21J *5/12*
U.S. Cl. 10—76 T **3 Claims**



1. A blank turn-over device for use in a high speed nut former machine which includes a machine body having at least a pair of spaced dies and means defining a feeding path for workpieces between the centers of at least a successive pair of said spaced dies comprising:

a shaft which is rotatable about its axis and positioned relatively perpendicularly to said feeding path; and

gripping means, located at the end of said shaft and coaxial with said shaft, for gripping workpieces in said feeding path, said gripping means cooperating with said shaft to perform the successive functions of receiving a workpiece in said feeding path and turning over said workpiece in said feeding path without lateral displacement of said workpiece from said path upon a rotation of the shaft about its axis on the order of 180° for subsequent removal of said workpiece from said gripping means in said feeding path.

4,017,929

DEVICE FOR PRESSING LOUIS SHOE HEELS

Antonio Capuano, Vigevano, Italy, assignor to SIGMA S.p.A., Vigevano, Italy

Filed Apr. 1, 1976, Ser. No. 672,667
Claims priority, application Italy, Apr. 18, 1975, 22502/75
Int. Cl.² A43D *63/00*
U.S. Cl. 12—16.4 **8 Claims**

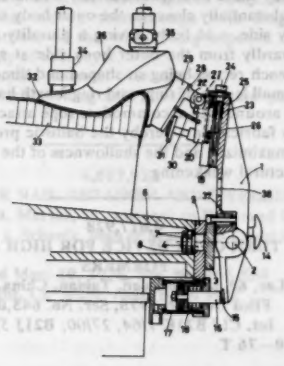
1. A device for pressing Louis shoe heels mounted on a cushion press for cementing soles to shoes comprising

a lever having pivotal mounting on said cushion press;

said lever having a first part extending longitudinally in one direction from said pivotal mounting and including a pad mounted at the end thereof for applying pressure against the heel;

said lever having a second part extending longitudinally in

the opposite direction from said pivotal mounting to terminate in an end portion; and



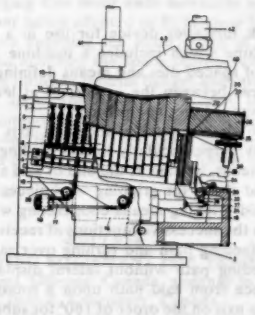
pressure means located on said cushion press to apply pressure against said end portion to provide a first rotational movement of said lever whereby said pad is pressed against the heel.

4,017,930

UNIVERSAL DEVICE FOR PRESSING SOLES ON SHOES

Antonio Capuano, Vigevano, Italy, assignor to Sigma S.p.A., Vigevano, Italy

Filed Jan. 23, 1976, Ser. No. 651,945
Claims priority, application Italy, Jan. 29, 1975, 19723/75
Int. Cl.² A43D *89/00*
U.S. Cl. 12—33 **8 Claims**



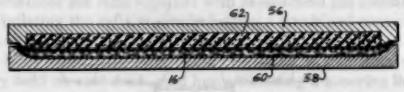
1. A device for pressing soles on shoes comprising
a cushion formed of a plurality of blocks for mating with the lower face of the shoe;
a base portion;
actuating means mounted on said base portion;
a frame mounted on said base portion and having said blocks resiliently movable in a vertical direction therewithin;
means connecting said blocks to said frame exerting a downward biasing force on said blocks;
a plurality of first locking means corresponding to and mounted respectively on each of said blocks;
a plurality of second locking means mounted on said frame, said second locking means corresponding in number with said first locking means, and each of said first and second locking means engageable in selective locking engagement in pairs to maintain a corresponding block in its pressing vertical position; and
means associated with said second locking means to provide release of said locking engagement upon selective operation of said actuating means.

4,017,931

LIQUID FILLED INSOLES

Preston L. Golden, Miami Beach, Fla., assignor to The Jonathan-Alan Corporation, Miami Beach, Fla.

Filed May 20, 1976, Ser. No. 688,299
Int. Cl.² A43D , *29/00*
U.S. Cl. 12—146 B **2 Claims**



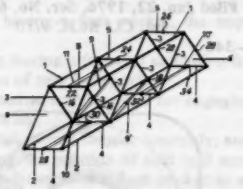
1. A method of making a liquid-filled insole of the character described, said method comprising the following steps:
a. forming a flexible, thermoplastic, dish-shaped bottom sheet in the outline of an insole,
b. introducing a liquid into said dish-shaped bottom sheet,
c. placing a second flexible, thermoplastic sheet in the outline of an insole upon said liquid-filled dish-shaped bottom sheet,
d. applying pressure to said second sheet to displace any air between it and the liquid in the dish-shaped bottom sheet,
e. heat-sealing the two sheets to each other along their peripheral edged to form a liquid-tight, liquid-filled envelope, and
f. heat-sealing the two sheets to each other in an orthopedic pattern between said sealed peripheral edges,
g. thereby forming a plurality of non-communicating, liquid-tight, liquid-filled compartments between the two sheets to provide a cushion effect.

4,017,932

TEMPORARY, MODULAR, SELF-ERECTING BRIDGE

Sergio Lotto, and Francesco Saggin, both of via Andrea Memmo, 11, Padua, Italy

Filed Dec. 13, 1974, Ser. No. 532,604
Claims priority, application Italy, Dec. 20, 1973, 41684
Int. Cl.² E01D *15/12*
U.S. Cl. 14—2.4 **23 Claims**



1. A temporary, modular self-erecting bridge comprising:
a. At least one module for spanning a distance, said module being mobile for movement from place to place,
b. said module comprising a pair of load-bearing side elements, a base element and a top element,
c. a number of mechanical means for opening said module by changing the height and width of said module,
d. said side elements comprising a number of diagonal elements including a number of elements pivotable about a point between their ends and responsive to said mechanical opening means, wherein
e. the number of pivotable elements is greater than the number of mechanical means,
whereby said bridge is transportable as a single structure having smaller physical dimension in its collapsed, transported state than in an open, erected state, and

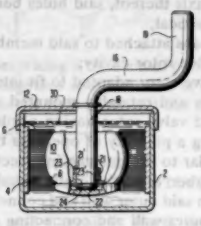
whereby a small number of mechanical means are used to erect a module comprising a substantially larger number of pivotable elements.

4,017,933

TYPEBALL CLEANING APPARATUS

Raymond A. Aja, 2 Murray Road, Essex Junction, Vt. 05452, and Alphonse C. Dufault, 1835 North Ave., Burlington, Vt. 05401

Filed May 14, 1976, Ser. No. 686,647
Int. Cl.² A46B *11/00*; B41J *29/00*
U.S. Cl. 15—21 A 6 Claims



1. A typeball cleaning apparatus for cleaning typewriter and terminal typeballs of the type having a bore therein with an engaging mechanism in the bore for engaging a mounting on the typewriter or terminal, said apparatus comprising:

a. a liquid container having an open top;

b. a plurality of brushes having one end mounted on the interior sides of said container, and the other end extending toward the axis of the container;

c. a top means for covering said container said top means having an aperture therein; and

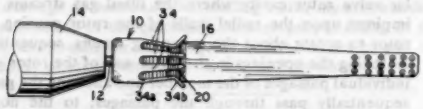
d. a crank having an engaging portion means, which passes through the aperture in said top means into said container, for insertion into the bore in said typeball for engaging and coupling with the engaging mechanism in the typeball, and a handle for turning said crank wherein when said crank is turned, a typeball coupled therewith is rotated such that its type face contacts said brushes whereby it is cleaned.

4,017,934

MOUNTING FOR POWER TOOTHBRUSH

Harold E. Callahan, 2841 Windy Hill Road, Apt. 1147, Marietta, Ga. 30067

Filed Apr. 9, 1976, Ser. No. 675,477
Int. Cl.² A46B *13/02*
U.S. Cl. 15—176 1 Claim



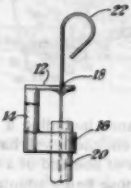
1. An adapter for coupling a toothbrush handle to the vibratory output shaft of a motor means, said handle having a central axially directed bore at its end and a circumferential groove proximate said end, said adapter comprising: a generally cylindrical body having front and rear bores for respectively receiving said handle and said shaft, said adapter comprising a resilient plastic body formed coaxially about a cup shaped metal insert, said rear bore being defined by the interior surface of said insert, plural roughening projections on said interior surface for frictionally engaging said shaft; said front bore being defined by plural angularly spaced axially extending fingers of said plastic body configured for snapping into said circumferential groove; a pin recessed coaxially within said front opening for engaging said bore in the end of said handle for centralizing said handle in said adapter, said pin being formed by the exterior surface of said metal insert.

4,017,935

DIP STICK CLEANER

Reginaldo A. Hernandez, 33 NW. 59th Ave., Miami, Fla. 33126

Filed Dec. 4, 1975, Ser. No. 637,707
Int. Cl.² G01F *15/12*, *23/04*
U.S. Cl. 15—210 B 1 Claim



1. A dip stick cleaner for use in cleaning a dip stick as utilized in a conventional oil containing combustion engine, said engine having a conventional dip stick tube, the invention comprising:

a supporting means attachable about said conventional dip stick tube;

a resilient planar member having a slotted portion for receiving and cleaning a dip stick;

a means for highly connecting said planar member to said supporting means and rotatable from a first position away from said conventional tube to a second position over the top of said tube, with the planar member substantially at right angles to the length of the tube.

4,017,936

WINDSHIELD WIPER ARRANGEMENT

Karl Schweikert, Buhl, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

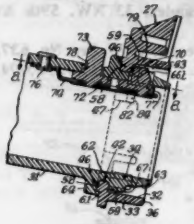
Filed Sept. 11, 1975, Ser. No. 612,578
Claims priority, application Germany, Oct. 5, 1974, 2447640
Int. Cl.² B60S *1/40*
U.S. Cl. 15—250.32 6 Claims

1. A windshield wiper carrier arm which is adapted to be connected to a wiper arm, comprising a channel-shaped body having two spaced side walls and a transverse rear wall extending between said side walls; and means for pivotally connecting said channel-shaped body to a wiper arm, including two integral tongues forming portions of said transverse rear wall and being bent from the plane of said rear wall to form a tubular pivot which extends between said walls and is adapted for engagement with the wiper arm.

4,017,937
HOSE COUPLING FOR A SUCTION CLEANER

William E. Hanold, Bloomington, Ill., assignor to National Union Electric Corporation, Greenwich, Conn.

Filed May 14, 1975, Ser. No. 577,284
Int. Cl.² A47L 5/00, 9/24
U.S. Cl. 15—327 R 8 Claims



1. In a suction cleaner including a casing having suction generating means therein and a wall having a suction opening for receiving a portion of one end of a cleaning tool hose, the opposite end of said hose being adapted to receive different types of cleaning tools, the improvement of coupling means for effecting rapid and positive coupling and uncoupling of said one end portion of said hose with said suction opening, said coupling means comprising a female coupling portion carried by said casing and a male coupling portion on the outer end of a fitting secured on one end of said hose, said female coupling portion including flange means extending radially inwardly into said suction opening and having axially inner and outer bearing surfaces, said flange means also having at least one recess in the periphery thereof, said male coupling portion including at least one radially outwardly extending lug, said lug being shiftable through said recess and movable into engagement with said inner bearing surface of said flange means to prevent disengagement of said male coupling portion from said suction opening when said male coupling portion is in a locked position, said fitting also having a collar on the outer periphery thereof and spaced axially from said lug, said collar extending radially outwardly from said fitting and having a combined annular bearing and sealing surface for engaging the axially outer bearing surface of said flange means and limiting axially inward movement of said male coupling portion into said suction opening so that said lug can be moved into engagement with said inner bearing surface of said flange means, catch means carried by said male coupling portion for engaging said female coupling portion and holding said male coupling portion in an operative, locked position in said suction opening, and manually actuated means on said fitting for releasing said catch means so that said male coupling portion can be disengaged from said opening.

4,017,938
CLEANER USING INTERMITTENT JETS OF FLUID SUPPLIED AT ABOVE AMBIENT PRESSURE

W. Paul Crise, 4921 NE. 2nd Ave., Pompano Beach, Fla. 33064

Continuation-in-part of Ser. No. 210,914, Dec. 22, 1971, abandoned. This application July 24, 1975, Ser. No. 598,811
Int. Cl.² A47L 5/14
U.S. Cl. 15—346 6 Claims

6. A cleaning tool for carpet and the like comprising:

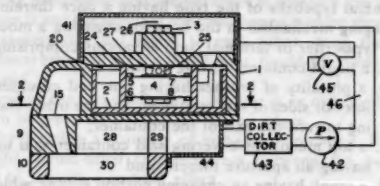
an elongated member having a normally substantially horizontal elongated opening therethrough, the lower portion of which member comprises means for engaging the surface of the material being cleaned;

a fluid flow means, superimposed upon, and sealingly secured to, said rectangular member, said flow means having a plurality of nozzle passages therethrough communicating with said opening and having an elongated cavity therethrough communicating with said opening at a site remote from the point of entry of said nozzle passage, said elongated cavity having an exhaust opening therein adapted to be sealingly connected to a means for evacuating gas;

a member, superimposed upon, and sealingly secured to, said fluid flow means, said member having a circular valve rotor cavity interiorly thereof, having a plurality of passages individually intersecting said rotor cavity about the circumference thereof and connecting said rotor cavity with discrete groups of said nozzle passages, and having a plurality of holes in the top of said member communicating with said cavity and disposed radially about the axis thereof, said holes being uniformly tilted from the vertical;

mounting means attached to said member interiorly of said circular valve rotor cavity;

a circular valve rotor adapted to fit into said circular valve rotor cavity and rotatably mounted upon said mounting means, said valve rotor having a solid bottom, an outer wall, having a plurality of openings therein of a size and shape similar to the passage intersections, an inner wall, and a number of radial walls equal to the number of openings in said outer wall and connecting said inner wall with said outer wall and connecting said inner wall with said outer wall and connecting said inner wall with said



outer wall immediately adjacent one side of each of said openings;

an intake manifold superimposed upon, and sealingly secured to, said member, having an opening therein adapted to be sealingly connected to a source or pressurized gas and having a second opening therein communicating with said holes in said member,

a gas pump having the exhaust side thereof sealingly connected to said opening of said intake manifold and the intake side thereof sealingly connected to said exhaust opening of said fluid flow means,

a pressure release means connected between said exhaust side of said pump and said intake manifold,

so constructed and arranged that pressurized gas supplied to the intake manifold will be forced generally downward through the tilted holes in the member and into the circular valve rotor cavity where the tilted gas streams will impinge upon the radial walls of the rotor causing the rotor to rotate about the mounting means, sequentially matching the openings in the outer wall of the rotor with individual passages of the member and allowing the gas to sequentially pass through the passages, to the nozzle passages associated therewith and therethrough, to impinge upon the portion of the material enclosed by the elongated rectangular opening of the elongated rectangular member and to, thereafter, be exhausted through the elongated cavity.

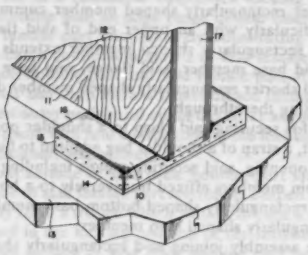
4,017,939
DOOR STOP

Minnie Schofield, St. Paul, Minn., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 12, 1976, Ser. No. 676,315
Int. Cl.² B32B 3/26; E05F 5/02
U.S. Cl. 16—82 4 Claims

1. A door stop device adaptable for fixing an open door in

a specific position when squeezed between the bottom edge of the door and the underlying floor surface, in the form of a



laminar structure comprising a base metal plate, a cover sheet of flexible sheeting, together with a section of soft foam material retained between the base plate and the cover sheet.

4,017,940

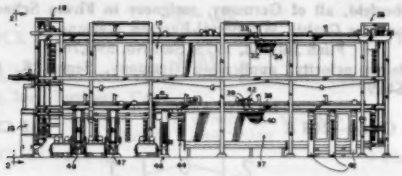
METHOD AND APPARATUS FOR STUFFING LOAF MOLDS

Charles H. Johnson, and Carroll P. Hartl, both of Madison, Wis., assignors to Oscar Mayer & Co. Inc., Madison, Wis.

Filed Mar. 11, 1975, Ser. No. 557,399

Int. Cl.² A22C *7/00*

U.S. Cl. 17—32 **10 Claims**



1. Apparatus for stuffing meat material into a horizontally arranged elongated tubular loaf mold open at one end and closed at the other end, which apparatus comprises: a stationary stuffing horn, a stuffing platform, a stuffing carriage for receiving the mold and movable along the stuffing platform relative the stuffing horn, means mounting the stuffing platform for vertical movement to align the mold with the stuffing horn, means for driving the carriage to position the stuffing horn within the mold at the closed end thereof, control means for connecting the stuffing horn to a pressurized source of meat material, means for actuating the control means to commence discharging meat material from the stuffing horn, the pressure of the meat material being such as to force the mold and carriage to move off the stuffing horn, means retarding the movement of the carriage to assure proper filling of the mold, and means for actuating the control means to end the discharge of meat material from the stuffing horn.

4,017,941

CASING SENSING MEANS FOR STUFFING APPARATUS

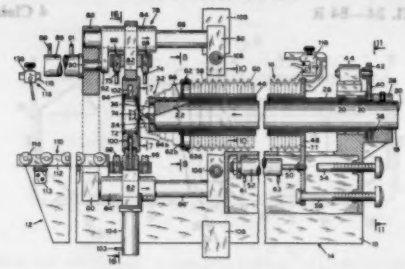
Vytas Andrew Raudys, Chicago, and Anton Leroy Mika, Downers Grove, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,254

Int. Cl.² A22C *11/02*

U.S. Cl. 17—41 **29 Claims**

1. In an apparatus for stuffing flowable product into shirred casing comprising a stuffing horn assembly adapted for mounting a shirred tubular casing, and including a tube having an inlet end for receiving flowable product from a pressurized supply and a discharge end for discharging the product; product stoppering means adapted to be indexed to a first position so as to allow the passage of pressurized product out through the discharge end of the tube into a mounted shirred casing and adapted to be indexed to a second position so as to prevent the flow of pressurized product out through said discharge end of the tube; means associated with said stuffing horn assembly and adapted for providing a closure after a selected length of casing is stuffed; and first control means for automatically providing consecutive cycles of a stuffing and



closing operation for producing stuffed products of a desired length; the improvement comprising sensing means adapted to detect movement of a trailing end portion of a mounted shirred casing, and second control means associated with said sensing means for interrupting the stuffing and closing operation so as to terminate the flow of product from the tube before the mounted shirred casing is completely expended.

4,017,942

TEXTILE CARDING

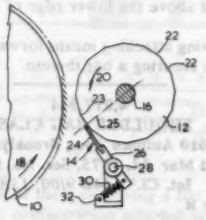
Malcolm Clayton, Huddersfield, and Keith Grimshaw, Todmorden, both of England, assignors to The English Card Clothing Company Limited, England

Filed July 15, 1974, Ser. No. 488,818

Claims priority, application United Kingdom, July 31, 1973, 36353/73

Int. Cl.² D01G *15/46*

U.S. Cl. 19—106 R **10 Claims**



1. Apparatus for removing a carded web of fibres from a rotating member, comprising a stripping roller mounted adjacent said rotating member for rotation about its own axis, and a blade-like member at least part of which is disposed close to the periphery of the stripping roller and means for deliberately imparting predetermined continuous controlled oscillation of said blade-like member relative to the periphery of said stripping roller for continuous opening and closing of the mouth formed between the stripping roller and the blade-like member.

4,017,943

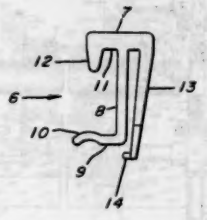
BRACKET AND CLIP FOR MOUNTING A CROSS-BAR TO A BRACKET

David M. Moore, Pittsburgh, Pa., assignor to Armstrong Store Fixture Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 544,968, Jan. 29, 1975, Pat. No. 3,965,540. This application Feb. 9, 1976, Ser. No. 656,142

Int. Cl.² A44B 13/00

U.S. Cl. 24—84 R 4 Claims



1. A bracket and clip construction for supporting a cross-bar on which merchandise display hooks or the like are mounted comprising:

a. a clip element having a top portion and a depending wall and a clip element at the rear of the top portion extending downwardly from the top portion alongside of the depending wall, the clip element being resiliently flexible in a direction away from the depending wall to frictionally grip an object inserted between the clip element and the depending wall,

b. the bracket having an arm for attachment to a support and a clip-supporting portion with upper and lower edges and of a thickness to be received between the depending wall of the clip and said clip element by springing the clip element in a direction away from the depending wall,

c. the bracket having an opening through the clip-supporting portion thereof and the clip having a projection on the clip element adapted to fit into said opening, the opening and projection being so positioned that the projection will enter the opening only when the clip is positioned on the clip-supportion portion of the bracket with the clip forced over the clip-supporting portion of the bracket to the full limit of movement provided between the clip element, the depending wall, and the top portion of the clip, said clip element being longer than the depending wall portion with the projection being on the terminal portion of the clip element, said opening in the clip supporting portion of the bracket arranged to receive said projection being located below the lowermost edge of said depending wall portion and above the lower edge of the clip-supporting portion,

d. the clip having attaching means forwardly of the depending wall for securing a bar thereto.

4,017,944

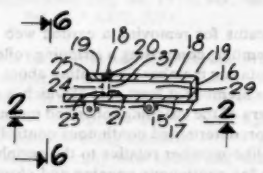
SHOULDER BAG CLASP

Hilda Cohen, 1010 Autumn Ave., Brooklyn, N.Y. 11208

Filed Mar. 14, 1975, Ser. No. 558,267

Int. Cl.² A44B 9/00, 13/00

U.S. Cl. 24—86 R 2 Claims



1. A shoulder bag clasp, which comprises:

a. a rectangularly shaped bottom base member;

b. an upwardly extending flange communicating perpendicularly with a right end of said base member;

c. a shorter rectangularly shaped member communicating perpendicularly with an upper end of said flange, said shorter rectangularly shaped member extends inwardly over said base member, said flange, said base member, and said shorter rectangularly shaped member describing an opening therethrough;

d. means for securing said clasp to a shoulder portion of a garment, a strap of a shoulder bag adapted to be received in said opening, said securing means including a pair of saftey pin members affixed transversely to a bottom face of said rectangularly shaped bottom base member;

e. a rectangularly shaped stop member;

f. a hinge assembly joining said rectangularly shaped stop member to a left end of said shorter rectangularly shaped member, said rectangularly shaped stop member of sufficient length to engage a top face of said rectangularly shaped bottom base member, when said rectangularly shaped stop member extends vertically downward; and

g. means for maintaining said stop member in a vertical downward position.

4,017,945

FASTENER FOR POCKETS, CASES OR THE LIKE

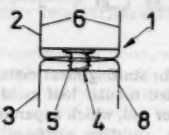
Raimund Stanik, Wuppertal-Beyenburg; Horst Gustav Appelt, Wuppertal-Barmen, and Walter Ramspott, Wuppertal-Elberfeld, all of Germany, assignors to Firma Schaeffer-Homberg GmbH, Wuppertal-Barmen, Germany

Filed July 28, 1975, Ser. No. 599,761

Claims priority, application Germany, Sept. 28, 1974, 2446469

Int. Cl.² A44G 17/00

U.S. Cl. 24—208 R 15 Claims



1. A fastener in the form of a release fastener, snap fastener and the like for pockets, cases and the like, comprising

two identically formed female type members,

one of said member serving as a female part and formed with an insert opening,

a closing head operatively releaseably lockingly engaging in said insert opening,

the other of said female type members constituting a male holding part formed with a hold carrying said closing head, said closing head extending through said hole and being formed with a rearward collar supported on said male holding part,

means on each of said two female type members, respectively defining said hole of said male holding part and defining said insert opening of said female part, for a plug-in catch connection between said male holding part and said closing head and for a plug-in snap-catch connection between said female part and said closing head, respectively,

said closing head comprises a closing head pin formed with two catch grooves disposed one behind the other in a longitudinal direction of said pin, said pin including a center zone of enlarged cross-section separating said two catch grooves from each other,

one of said catch grooves lies adjacent said collar and cooperates in a snap-catch connection relationship with an edge range of said hole of said male holding part cooperatively constituting said plug-in snap-catch connection means of said male holding part,

the other of said catch grooves is formed adjacent a free end of said pin and cooperates in a locking position of the fastener in a releasable snap-catch locking engagement relationship with an edge range of said insert opening of said female part cooperatively constituting said plug-in snap-catch connection means of said female part,

said male holding part and said female part are identically formed and each have a front surface facing each other and an outer peripheral edge, the latter aligned in a common plane with said center zone in the locking position of the fastener, respectively,

said front surface of said male holding part and said front surface of said female part are funnel shaped and cooperatively form a trough which widens toward a center point thereof in the locking position of the fastener, and

said front surface of said male holding part and said front surface of said female part are clamped abuttingly against each other adjacent said outer edges respectively in the releasable locking position of the fastener by said catch grooves of said closing head engaging with said plug-in snap-catch connecting means of said male holding part and said female part, respectively.

4,017,946

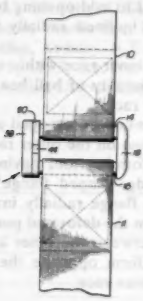
LOCK SCREW FOR RIGGING CONNECTOR OR THE LIKE

Frank John Soja, Sun Valley, Calif., assignor to Alta Engineering, Inc., Burbank, Calif.

Filed Mar. 1, 1976, Ser. No. 662,343

Int. Cl.² A44C 5/18

U.S. Cl. 24—265 AL 9 Claims



1. In a locking device:

a. a pair of companion hardware parts adapted to be locked together;

b. one of said hardware parts having a threaded female fastener element;

c. said other of said hardware parts having a recess facing outwardly, there being an access opening in the bottom of said recess registrable with said female fastener element;

d. a screw in said recess having a shank extended through said access opening and threadedly engaging said female fastener element;

e. said screw having a head entirely accommodated in said recess;

f. said recess having, near its outer end, an internal groove;

g. said recess and said head having companion keyways; and

p1 h. a spring retaining member snapped in said groove, said retaining member having a key extending into both of said keyways whereby said screw is releasably retained in position notwithstanding shock and vibration.

4,017,947

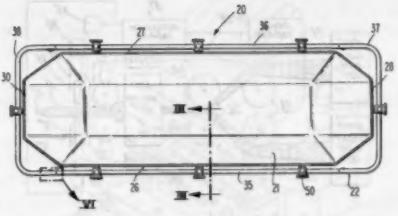
CASKET AND CASKET SUPPORT

Hugh Collier Acton, Augusta, Mich., assignor to Boyertown Burial Casket Company, Boyertown, Pa.

Filed Oct. 20, 1975, Ser. No. 624,300

Int. Cl.² A61G 17/00

U.S. Cl. 27—27 19 Claims



1. A casket comprising a tub portion and a lid portion, each of said tub portion and lid portion being free of any connected handles, said tub portion having generally upstanding walls and a bottom wall, and having engagement means integral with and completely around a lower portion of said upstanding walls, said engagement means comprising a u-shaped channel-like means for ready-detachably receiving portions of a normally separate reusable carrying structure in engagement therein.

4,017,948

HEDDLE CARRYING RODS WITH CONNECTORS AND/OR PIECES

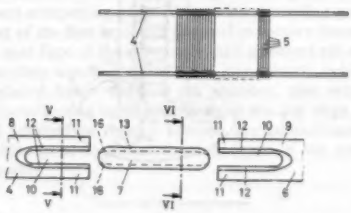
Erich Vogelbacher, Horgen, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland

Filed Mar. 23, 1976, Ser. No. 669,561

Claims priority, application Switzerland, Apr. 3, 1975, 4259/75

Int. Cl.² D03J 1/14; D03C 9/00

U.S. Cl. 28—46 9 Claims



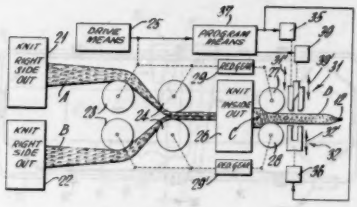
1. In a heddle rod of the type having a flat elongated substantially rectilinear configuration adapted to carry heddles having closed end loops, the improvement comprising said rod having a longitudinally extending open ended slot in at least one end thereof defining a pair of shanks and attachment means being of a thickness substantially equal to the thickness of the rod so that the closed end loops of heddles can pass over said attachment means; said attachment means being detachably secured to said end of said rod including a flat elongated projection having upper most and lower most surfaces slidably disposed within said slot in engagement with said shanks, the opposing surfaces of said shanks and said projection having substantially complementary interfitting configurations to prevent lateral separation of said projection and said rod.

4,017,949

METHOD OF MAKING A SCOURING PAD OR THE LIKE

George B. Botvin, Cumberland, R.I., assignor to ACS Industries, Inc., Woonsocket, R.I.

Filed Feb. 27, 1975, Ser. No. 553,509
Int. Cl.² D05B 1/08
U.S. Cl. 28—77 10 Claims



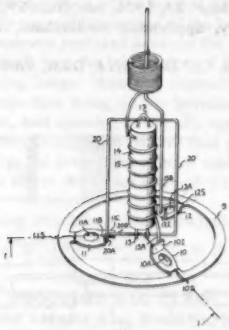
1. The method of making a scouring pad or the like which comprises loosely knitting an elongate pliant outer tube around a loosely knitted elongate pliant inner tube of stuffing material, one of said tubes being inside-out knitted with respect to the other, whereby the grain of adjacent surafaces of said tubes may be in essentially the same predominant direction, locally compressing the outer tube upon the stuffing material at longitudinally spaced locations to define first and second transversely extending end alignments of a pad, locally securing the compressed materials at said alignments, such securing including the step of stitching separate seams along said end alignments, and severing individual pads thus end-secured.

4,017,950

METHOD FOR MAKING A GAS SENSOR ASSEMBLY

William J. Schultz, Lynnfield, Mass., assignor to General Electric Company, Schenectady, N.Y.

Filed June 16, 1976, Ser. No. 696,608
Int. Cl.² H01J 9/36
U.S. Cl. 29—25.15 9 Claims



1. A method for making a gas sensor assembly comprising the steps of:

providing a metal annulus having a plurality of inwardly extending spaced tongues, each of said tongues being provided with a clamping means-receiving aperture therethrough,

welding opposite ends of a heater wire, respectively, to each of two of said tongues,

welding a combination support wire and electrical connector to a third of said tongues,

positioning portions of said heater wire and said support wire within a cup-shaped housing having a plurality of clamping means mounted thereon whereby each of said apertures in the respective tongues has one of said clamping means inserted partly through it,

fastening said clamping means to clamp the respective tongues against said housing, and

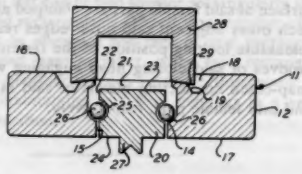
separating each of the tongues from the annulus.

4,017,951

METHOD FOR MANUFACTURING BALL BEARINGS HAVING A SINTERED METAL POWDER OUTER RACE

Nick A. Aromando, Lyndhurst, N.J., assignor to Hillside Metal Products, Inc., Newark, N.J.

Continuation-in-part of Ser. No. 324,733, Jan. 18, 1973, abandoned. This application Jan. 23, 1974, Ser. No. 435,683
Int. Cl.² B21D 53/10
U.S. Cl. 29—149.5 PM 28 Claims



1. A method for manufacturing ball bearings having a generally annular outer race of molded and sintered metal powder, a cooperative inner race within an opening defined by the outer race and a plurality of ball bearings entrapped in a raceway formed by the inner and outer races comprising:

a. forming a generally annular outer race preform of molded and sintered metal powder, said preform having substantially concentric inner and outer annular faces, the said inner annular face having radially inwardly disposed first ball bearing entrapment means, and a side face joining said inner and outer annular faces, said side face having a generally annular wedge-shaped flange substantially concentric with the inner and outer annular faces, the wall of said flange distal to said opening being straight from top to bottom and inclined radially inwardly toward said opening:

b. positioning the inner race within said opening;

c. positioning a plurality of ball bearings intermediate the inner and outer race;

d. the ball bearings being entrapped on one side by said first entrapment means on the outer race; and

e. engaging a deforming tool having a flat working face against the wedge-shaped flange deforming at least a portion of said flange radially inwardly to generate an entrapment from the deformed portion which entraps the ball bearings between the inner and outer races on the side of the preform opposite the said first entrapment means of the outer race.

4,017,952

METHOD FOR DISASSEMBLING AND REPAIRING A SODIUM-HANDLING APPARATUS

Kiyomitsu Nemoto, Mito; Kesahiro Naito, Hitachi; Megumu Urata, Ibaraki, and Norihiko Sagawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

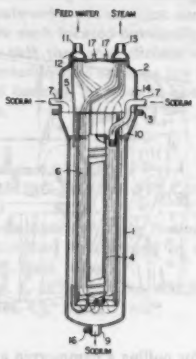
Filed Nov. 4, 1974, Ser. No. 520,905
Claims priority, application Japan, Nov. 9, 1973, 48-125283
Int. Cl.² B23P 15/26, 17/00
U.S. Cl. 29—157.3 R 15 Claims

1. A method for disassembling and repairing sodium-handling apparatus for use at a high temperature, said sodium-handling apparatus having a sodium-handling space therein for handling sodium, which comprises:

1. discharging metallic sodium from the sodium-handling space of said apparatus,

2. filling an inert gas in the sodium-handling space of the apparatus,

3. cooling metallic sodium retained on the surfaces of the sodium-handling space of the apparatus to lower than the sodium solidification temperature,
4. flushing the inert gas from said sodium-handling space with a reacting gas capable of reacting with metallic sodium to form a weak alkali soluble in metallic sodium,
5. forming a solid film of a neutral salt on the surfaces of the metallic sodium by reaction of the reacting gas with metallic sodium,
6. discharging the reacting gas from the apparatus,
7. disassembling and repairing the apparatus in the atmosphere, and thereafter
8. putting the apparatus in a high temperature operation while retaining the solid films of the neutral salt on the surfaces of the metallic sodium.



4,017,953

HEAT EXCHANGERS

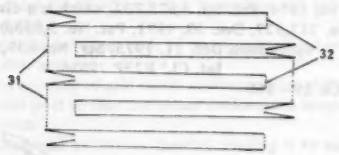
Gordon Robert Creighton, Cambridge, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 9, 1975, Ser. No. 566,567

Claims priority, application United Kingdom, Apr. 11, 1974, 16126/74

Int. Cl.² B23P *15/26*

U.S. Cl. 29—157.3 V **14 Claims**



1. A method of making a heat exchanger consisting of a conduit having a plurality of passes joined by integral return bends which comprises
   i. stacking at least three pairs of oblong strips of material together so that alternate pairs of strips overhang the stack along one of the shorter edges thereof and the remaining alternate pairs of strips overhang the stack along the other of the shorter edges thereof,
   ii. bonding the individual strips of each pair together along the shorter edge which does not overhang the stack, bonding the adjacent strips of adjacent pairs along both longer edges of said strips and bonding the adjacent overhang areas of said alternate pairs of strips along the three peripheral edges of said overhang, thereby forming a flat, serpentine conduit, and
   iii. inflating the conduit by applying internally a fluid under pressure.

4,017,954

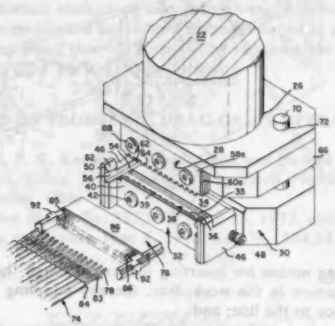
TOOL FOR GANG CRIMPING RIBBON COAXIAL CABLE

Daniel Baker Grubb, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sept. 22, 1975, Ser. No. 615,273

Int. Cl.² H01R *43/00*; **H05K** *13/06*

U.S. Cl. 29—749 **1 Claim**



1. An assembly for staking a plurality of parallel wires to a connector having a wire-receiving section and a housing portion and further said wire-receiving section having two rows of wire-in-slot blade contacts with the slot openings in one row facing in a diametric direction relative to the slot openings in the other row, said assembly being positionable in a tool having a base and movable means above the base for vertical reciprocal movement, said assembly comprising:
   a. a staker plate assembly comprising three plates each having a plurality of teeth depending from the bottom edges, said plates being positioned front to rear on the movable means with said teeth on each plate being in alignment with the teeth on the other plates, further, said assembly having means to space each plate one from the other predetermined distance; and
   b. a stationary assembly mounted on the base and comprising a connector receiving platform having a first and second level, said first level being in alignment with the staker plate assembly and adapted to receive thereover the wire-receiving portion of the connector, said second level lying behind and below the first level and adapted to receive the housing portion of the connector, and further said stationary assembly having retaining and centering means comprising a first rib member extending across the front of the first level and adapted to receive thereagainst the rear face of the connector, and a second rib member extending across the first level immediately behind and displaced below the first rib member, said second rib member having teeth spaced along the top edge thereof and adapted to receive thereon the contact-containing cavities so as to center the connector on the stationary assembly.

4,017,955

APPARATUS FOR ATTACHING A WORKPIECE TO A CONTINUOUS LENGTH OF LINE

Gerald Peter Hermanson; David Murray Rickel, both of Maitland, and Robert Joseph Carr, Winter Park, all of Fla., assignors to Dayron Corporation, Orlando, Fla.

Filed June 9, 1976, Ser. No. 694,243

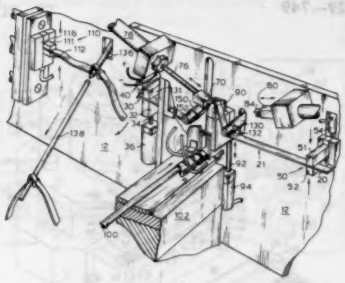
Int. Cl.² B23P *19/04*

U.S. Cl. 29—564.8 **21 Claims**

1. An apparatus for coupling a workpiece of the type having a one way aperture therein to a specified position along a continuous length of line and then cutting said line to a predetermined length, said apparatus comprising in combination:
   workpiece receiving means for receiving the workpiece

thereon and for moving the workpiece into communication with the line adjacent the specified position therealong for tensioning the line over the workpiece;

tension adjusting means for regulating the tension of the line over the workpiece;



stuffing means for inserting the line through the one way aperture in the workpiece, thereby coupling the workpiece to the line; and

cutting means for severing the line at the predetermined length.

4,017,956

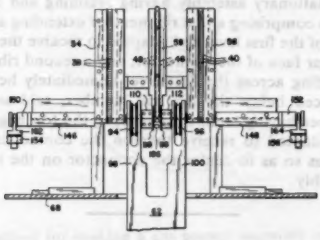
APPARATUS FOR MAKING INCANDESCENT LAMPS AND THE LIKE

Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758

Division of Ser. No. 372,535, June 22, 1973, Pat. No. 3,914,640, which is a division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application Aug. 8, 1975, Ser. No. 603,159

Int. Cl.² B23Q *7/10*

U.S. Cl. 29—810 **7 Claims**



1. Apparatus for manufacturing lamp envelopes or the like, comprising a pair of magazines for receiving stacks of components, said magazines having a pair of spaced aligned ends and a transport arranged to move into and out of the space between said ends of the said magazines, said transport having a pair of component-receiving platforms alignable with said ends of said magazines, respectively, and a pair of pusher means associated with said magazines, respectively, for pushing an end component of each stack onto said platforms, respectively, said platforms being supported upon rotatable hubs on said transport, said hubs having axial bores through which said components are pushed onto said platforms by said pusher means, respectively.

4,017,957

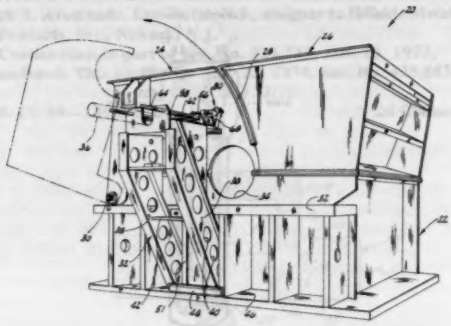
HAMMERPIN PULLER

Fredrick B. Dreyer, Maplewood, Mo., assignor to Gruendler Crusher & Pulverizer Co., St. Louis, Mo.

Filed June 6, 1975, Ser. No. 584,606

Int. Cl.² B23P *19/04*

U.S. Cl. 29—252 **13 Claims**



1. A means for pulling a hammerpin adapted for use with a hammermill frame and having hammerpins supporting a plurality of hammers, said pulling means including a support frame attached to the hammermill frame, a clamp for gripping a selected one of said hammerpins, a means for opening and closing the clamp on the selected hammerpin, a support plate having first and second sides, said support plate pivotally supporting the clamp on the first side and attached to a means to reciprocate the plate on the second side, first and second hammerpin engaging means for supporting the hammerpin as it is pulled, said reciprocating means attached to the first of said hammerpin engaging means, and a pair of guide rod means interconnecting the first and second hammerpin engaging means and the support plate, said first and second hammerpin engaging means supported by said support frame.

4,017,958

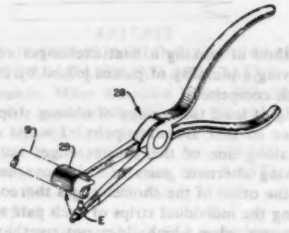
IRRIGATION APPARATUS

Richard E. Diggs, 12A Road R3, P.O. Box 776, Carthage, Mo. 64836

Division of Ser. No. 549,556, Feb. 13, 1975, Pat. No. 3,966,233, which is a continuation-in-part of Ser. No. 498,181, Aug. 16, 1974, Pat. No. 3,973,732, which is a division of Ser. No. 213,927, Dec. 30, 1971, Pat. No. 3,833,019. This application Dec. 11, 1975, Ser. No. 639,860

Int. Cl.² B23P *19/04*

U.S. Cl. 29—268 **1 Claim**



1. A tool for installing a self-piercing irrigation fitting to a length of plastic pipe, comprising:

a long-nose plier having a pair of tapered gripping jaws with one jaw having a gripping end portion which has a first tip and a flat face presented toward the other gripping jaw, the taper of said one jaw being sufficient to receive the

fitting which is to be forced into the pipe, and the other jaw having a back surface, a pair of side surfaces and a second tip; and

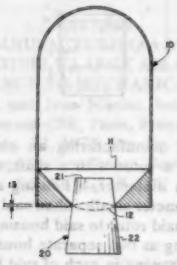
a semi-cylindrical backing member for supporting a pipe to which the fitting is being installed, said backing member having a pair of sides with one side integrally attached to said second tip and the other side located to coincide with said first tip, said backing member having a back surface which extends outwardly of said back surface and a pair of ends which are each located outwardly of each of said side surfaces so that the inner surface of said backing member is presented toward said one jaw flat face so that pipe held in said backing member is located above said one jaw flat face.

4,017,959

METHOD OF FORMING SHRINK-FIT COMPRESSION SEAL

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Ted J. Podgorski, St. Paul, Minn.

Filed Apr. 1, 1976, Ser. No. 672,815
Int. Cl.² B23P 11/02
U.S. Cl. 29—447 **5 Claims**



1. A method of making a noncontaminated glass-to-metal seal between a glass post and a metal enclosure having an opening therein, the periphery of the opening being a seal edge of controlled dimensions, comprising the steps of:

shaping said glass post such that its cross section is in the shape of said opening and such that it is tapered along its length with the resulting smaller end being slightly smaller than said opening; and such that its surface has a desired surface finish;

placing said shaped glass post in an upright position with said smaller end up;

placing said opening of said metal enclosure over said small end of said post so that the metal enclosure is supported by said post;

heating said metal enclosure thereby causing it to expand and slip down said post; and

cooling said metal enclosure whereby the seal edge of said metal enclosure crushes against said glass post forming the desired seal.

4,017,960

METHOD OF REPAIRING INJURED PORTION OF REFRACTORY FURNACE-LINING

Naoshi Kawabe; Toshikatu Haga, both of Iwaki; Taiitu Nakajima, Tokyo; Takeshi Takahashi, Sagamihara; Hiroshi Shinoda, Gifu, and Shuji Hayakawa, Nagoya, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and NGK Insulators, Ltd., Nagoya, both of, Japan

Filed Nov. 26, 1975, Ser. No. 635,354
Int. Cl.² B23P 7/00; F27D 1/16
U.S. Cl. 29—401 E **5 Claims**

1. A method of repairing an injured portion of a refractory furnace-lining which comprises:

cutting off the injured portion of said lining through the outside furnace shell of said portion together with said shell using a supersonic flame jet cutter without using thermit;

inserting a rigid refractory lining block, having substantially the same shape and size as said through-cut hole, into said through-cut hole; and

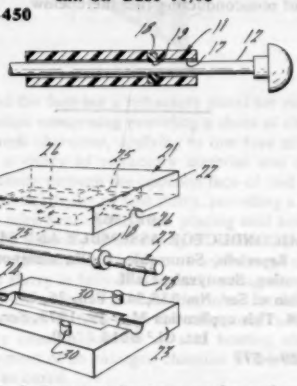
welding the surrounding periphery of the inserted block to the contact surface of said through-cut hole using the above-mentioned supersonic flame jet cutter as a welder without using thermit, followed by repairing the outside cut-off shell portion of the furnace.

4,017,961

METHOD OF PRODUCING DRAG ON AN OPERATING ROD

Werner W. F. K. Kochte, Ravenna, Ohio, and Donald D. Bartholomew, Utica, Mich., assignors to Merit Plastics, Inc., East Canton, Ohio

Continuation of Ser. No. 353,591, April 23, 1973, abandoned. This application June 5, 1975, Ser. No. 584,145
Int. Cl.² B23P 11/02
U.S. Cl. 29—450 **3 Claims**



1. The method of constructing an operation rod assembly to prevent the rod from rattling within its holder which includes the steps of: supporting an elastomeric ring on a rod-like core said elastomeric ring being of a smaller inner diameter than the diameter of an operating rod to be inserted therein, supporting the rod-like core with said elastomeric ring thereon in a mold across a cavity therein, injecting a plastic material within the cavity about said rod-like core and elastomeric ring to form the holder, removing said holder from the mold, removing said rod-like core from said holder to provide a longitudinally extending aperture, and inserting said operating rod having a diameter slightly smaller than said rod-like core within said aperture and through said elastomeric ring for longitudinal movement within said aperture with the operating rod retained in place after movement by said elastomeric ring which also prevents the rattling of the operating rod within the aperture.

4,017,962

INTEGRATED ARRAY OF OPTICAL FIBERS AND THIN FILM OPTICAL DETECTORS, AND METHOD FOR FABRICATING THE SAME

John P. Palmer, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Division of Ser. No. 591,200, June 27, 1975, Pat. No. 3,987,300. This application July 23, 1976, Ser. No. 708,164
Int. Cl.² B01J 17/00
U.S. Cl. 29—572 **10 Claims**

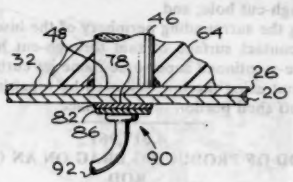
1. A method for registering an optical fiber and a thin film optical detector, which comprises the steps of:

a. mounting a light emitting portion of an optical fiber in fixed relationship with, and in close proximity to, a first surface of a semiconducting film;

b. applying a photosensitive emulsion film to a second surface of said semiconducting film;

c. directing light through said optical fiber and out said light emitting portion thereof to activate only that portion of said emulsion film in registration with said light emitting portion;

d. removing only said activated portions of said emulsion



film and thereby creating a window in said emulsion film in optical registration with said light emitting portion of said optical fiber; and

e. forming an optical detecting element by depositing a metallic film through said window onto the exposed portion of semiconducting film therebelow.

4,017,963

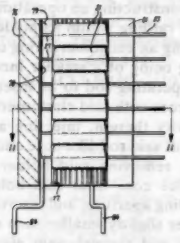
SEMICONDUCTOR ASSEMBLY AND METHOD

Fritz W. Beyerlein, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Division of Ser. No. 335,542, Feb. 26, 1973, Pat. No. 3,905,038. This application May 19, 1975, Ser. No. 578,673

Int. Cl.² B01J *17/00*

U.S. Cl. 29—577 **3 Claims**



1. In a method for fabricating a semiconductor assembly of the type utilizing a package comprising a semiconductor body having at least a portion of an electrical circuit formed therein with a plurality of contact pads in a predetermined pattern carried by the body and lying in a common plane, a plurality of first leads bonded to said plurality of contact pads, said first leads extending outwardly from the semiconductor body and having outer extremities which lie in a predetermined pattern, first encapsulating means encapsulating said semiconductor body and portions of said first leads in engagement with said contact pads and so that the outer extremities of the first leads are free of the first encapsulating means and are readily accessible, the method comprising positioning a plurality of said packages one above the other and electrically interconnecting corresponding leads of each of the packages wherein the step of interconnecting the corresponding leads of the packages includes the steps of providing a tube, forming slots in the tube and placing the corresponding leads of the packages in the slots and providing means within the slots interconnecting the leads.

4,017,964

METHOD OF MANUFACTURING ELECTRICAL MACHINERY HAVING A ROTOR

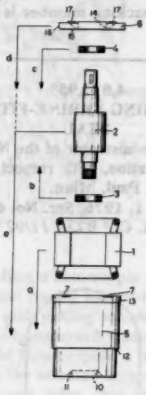
Siegfried Schulte, Geveindorf, and Wilhelm Schmitt, Ringenberg, both of Germany, assignors to Firma Schulte Elektrotechnik KG, Luedenscheid, Germany

Filed Oct. 6, 1975, Ser. No. 619,794

Claims priority, application Germany, Oct. 12, 1974, 2448699; May 28, 1975, 2523604

Int. Cl.² H02K *15/14*

U.S. Cl. 29—596 **10 Claims**



1. A method of manufacturing an electrical machinery assembly including a rotor with a shaft, a stator having an inner bore of given diameter, a housing and bearing means having an outer diameter smaller than said stator bore diameter and supporting said rotor in said housing, comprising deep drawing said housing as two separate housing members from sheet metal, deep drawing in each of said housing members a respective bearing seating surface, deep drawing in at least one of the housing members a stator supporting shoulder, inserting said stator into said one housing member to rest against said shoulder, first placing said bearing means on said rotor shaft and then inserting the rotor with its bearings into said one housing member, aligning the one housing member with the other housing member and applying axially directed pressure to form the assembly whereby the bearing means are centered and seated on said bearing seating surfaces of said housing members, wherein said bearing seating surface and said shoulder in said one housing member are formed in a single deep drawing step, wherein said one housing member is provided, also by deep drawing, with a conical inner rim around its open end, and wherein the other housing member is provided with a matching conical outer rim fitting into said inner rim and securing said housing members to each other by pressing said rims together whereby said conical rims provide an automatic self-centering of the entire assembly.

4,017,965

METHOD OF MAKING A TRANSDUCER HEAD WITH NARROW CORE STRUCTURE

Werner Brutsch, Garberville; Michael Isaac Behr, South Pasadena, and Ko Ko Gyi, Thousand Oaks, all of Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed June 16, 1975, Ser. No. 587,429

Int. Cl.² G11B *5/42*

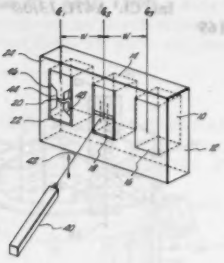
U.S. Cl. 29—603 **16 Claim**

1. A method of manufacturing a core for a magnetic tran ducer so as to provide a high density transducing capabilit comprising the steps of:

inserting a core having a gap into an aperture in a base the transducer;

filling remaining portions of said aperture with a bonding material;

lapping the exposed surfaces of said core and bonding material to form a plane surface with the base;



reducing the core gap width to approximately 0.5 mil by exposing the core material adjacent the gap to a laser beam of energy sufficient to remove the material; and

relapping the exposed surfaces of said core and bonding material to form a plane surface with the base.

4,017,966

METHOD OF MANUFACTURING A MAGNETIC HEAD HAVING A RELATIVELY LARGE AIR-GAP AND A GOOD RESISTANCE TO MECHANICAL WEAR

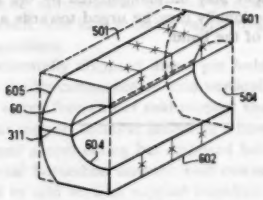
Antoinette Morell, and Jean Nicolas, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Aug. 22, 1975, Ser. No. 607,019

Claims priority, application France, Sept. 6, 1974, 74.30336

Int. Cl.² G11B 5/42

U.S. Cl. 29—603 **2 Claims**



1. A method of manufacturing a magnetic head assembly, including a U-shaped component consisting of a pair of magnetic ferrite sections, each of them having at least one flat face, and a gap, serving as an air-gap, consisting of a non-magnetic ferrite layer interposed between said flat faces, said method comprising the steps of:

cutting a disc of magnetic ferrite material into at least two slices having two large opposite faces and grinding them so as to achieve parallelism therebetween of the order of approximately 10 microns;

preparing a powder of zinc and iron oxides able to yield by sintering a non-magnetic ferrite, and mixing the same with a binder so as to form a paste;

depositing a layer of said paste by silk-screen printing on one face of at least one of said slices, and drying said layer so as to eliminate the binder;

bonding said two slices together, by sintering the same under pressure, for obtaining a composite member in which said layer in sandwiched between the two slices; and

machining said composite member by a) cutting said member for obtaining at least one elongate bar which is a rectangular parallelepiped; b) drilling and grinding said bar in the longitudinal direction so as to obtain an elongate U-shaped block; and c) transversely cutting said block for obtaining a series of U-shaped components, one of which is to be used in assembly.

4,017,967

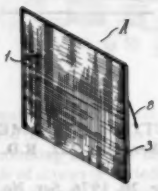
METHOD OF MAKING INFRARED EMITTER

Harold D. Wells, St. Louis County; E. Warner Hughes, Ballwin, and Robert F. Bales, Maryland Heights, all of Mo., assignors to Black Body Corporation, Fenton, Mo.

Continuation of Ser. No. 563,621, March 31, 1975, abandoned. This application June 7, 1976, Ser. No. 693,162

Int. Cl.² H05B 3/18

U.S. Cl. 29—611 **3 Claims**



1. A method for forming a refractory panel for emission of infrared radiation comprising providing a sheet of dielectrical material of mesh character, applying to one face of said dielectric sheet a slurry of refractory material and a binder, applying a vacuum through the opposite face of said dielectrical sheet for partial drying of said slurry, providing a non-helical resistance wire heating element, placing said heating element upon said partially dried slurry of refractory material, then making a second application of said slurry upon said partially dried slurry to fully encase said heating element, and then applying a current to said heating element for causing heating of the same to fully cure the refractory material and simultaneously cause expansion of said heating element to effect development of an enlarged chamber within the refractory material as cured.

4,017,968

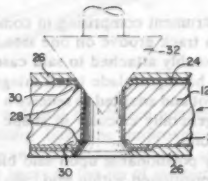
METHOD OF MAKING PLATED THROUGH HOLE PRINTED CIRCUIT BOARD

Walter Weglin, Bellevue, Wash., assignor to Jerobee Industries, Inc., Redmond, Wash.

Filed Sept. 18, 1975, Ser. No. 614,533

Int. Cl.² B41M 3/08

U.S. Cl. 29—625 **23 Claims**



1. In a circuit board having generally planar first and second surfaces and comprising a substrate, a first circuit element on one side of the substrate, and a second circuit element on the opposite side of the substrate,

a method of making a connection from one circuit element to the other through the substrate, said method comprising:

a. providing in the circuit board a through hole extending through both circuit elements and through the substrate,

b. forming portions of the first and second circuit elements adjacent said hole from the planes of, respectively, the

first and second surfaces into the hole to make first and second inwardly flared circuit element portions, and covering the first and second planar surfaces of the board with a substantially uniform plating resist material, while providing as exposed areas the inwardly flared circuit element portions and the hole area therebetween exposed, and

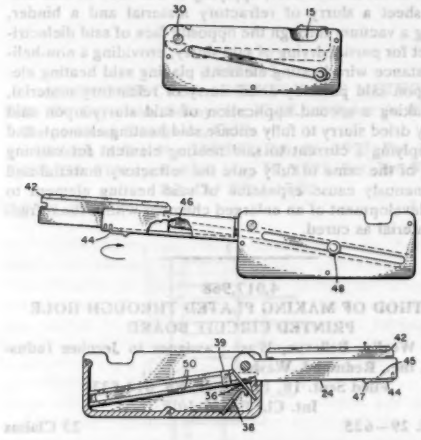
c. plating the exposed areas of the board to form a through hole connection having a middle portion extending through the hole and two end portions overlapping the two inwardly flared circuit element portions.

4,017,969

CUTTING INSTRUMENT

Robert E. Stonebraker, Box 222, R.D. No. 3, Tyrone, Pa. 16686

Filed Apr. 20, 1976, Ser. No. 678,478
Int. Cl.² B26B *3/06*; F41B *13/02*; F41C *27/02*
U.S. Cl. 30—156 **8 Claims**



1. A cutting instrument comprising in combination:

A case having a track groove on one side thereof;

A blade pivot rotably attached to said case;

A blade holder having a blade track integrally attached to said blade pivot and adapted to receive a blade, said blade pivot being generally circular in shape with a flat cam surface thereon;

A blade slidably positionable upon said blade holder;

An ejector rod positioned within said case and aligned with said blade track when the instrument is in its open position;

An ejector button integrally attached to said ejector rod and extending through said track groove to the outside portion of said case;

A blade lock member positioned within said case and against said blade pivot;

A blade lock spring attached to said case and biasing said blade lock member against said blade pivot;

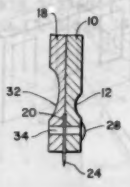
A stop member integrally positioned on said case at the end of said track groove and adapted to stop said ejector button when it is slid up said track groove.

4,017,970

TILE AND TUB SCRAPER

Ann Williams, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Oct. 6, 1975, Ser. No. 620,211
Int. Cl.² A47L *13/08*
U.S. Cl. 30—169 **3 Claims**



1. A hand held scraper comprising a first flat blade holder means having a flat surface, said first blade holder having a substantially horizontal concave groove on the surface opposite said flat surface for gripably receiving a forefinger, said flat surface of said first blade holder abuttingly positioned against the flat surface of a second flat blade holder, said second blade holder having a concave indentation thereon opposite its flat surface for gripably receiving a thumb, said indentation being substantially vertical to said groove, said first blade holder and said second blade holder having opposed recessed surfaces along one side, said holders being positioned so that the flat surfaces of each abut one another flushly for positioning a scraper blade between said recessed surfaces so that the edge of said blade is exposed and substantially parallel to said groove, removable pin means securingly inserted through said first and second holders for attaching said holders to one another and holding a scraper blade in a fixed position in said scraper, said first and second blade holders being of a size sufficient to fit in the palm of the hand so that said scraper may be manipulated by the thumb and forefinger and optionally may be urged towards a work surface by the heel of the hand.

4,017,971

MODULAR PROSTHETIC DENTURES

Mitchell M. Hazar, Phoenix, Ariz., assignor to American Denture Corporation, Scottsdale, Ariz.

Filed Dec. 11, 1975, Ser. No. 639,982
Int. Cl.² A61C *13/00*
U.S. Cl. 32—2 **6 Claims**

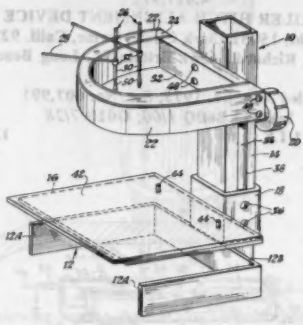
1. Modular prosthetic dentures comprising maxillary and mandibular units; each unit being fittable to a variety of patients; each unit having a hard base; teeth fixed to said hard base; a deflectably formable layer bonded to said hard base and being deflectably fittable to an edentulus ridge; the teeth of one of said units having flat plane occlusion geometry.

4,017,972

DOWEL PIN POSITIONER

Edward C. Glenn, 1455 NE. 55th St., Fort Lauderdale, Fla. 33334

Filed July 7, 1975, Ser. No. 593,280
Int. Cl.² A61C 13/00
U.S. Cl. 32—11 2 Claims



1. A dowel pin positioning device for positioning dowel pins utilized in the construction of dental prosthetic appliances from impression devices comprising:

a rigid, hollow vertical support shaft, said shaft having a vertical slot;

a base member connected to one end of said rigid, vertical support shaft, said base member supporting said shaft in a vertical position;

a rigid, horizontally disposed dowel pin holder supporting member rigidly connected to said vertical support shaft near the upper free end of said support shaft, said dowel pin holder support member including a horseshoe shaped magnet and a connecting bar disposed between the free ends of said horseshoe magnet, said connecting bar rigidly fixed to said vertical support member;

a rigid platform;

a slip ring connected around the outer circumference of said vertical shaft, said slip ring rigidly fixed to said rigid platform, said platform being horizontally disposed,

a gear rack connected within said hollow interior of said support shaft and connected to said slip ring;

a fastening means connected to said slip ring and said gear rack through said vertical shaft slot;

a ring gear rotatably connected within said hollow vertical shaft and engaged with said gear rack;

means for rotating said ring gear connected to said ring gear and mounted on said vertical shaft;

a removeable tray mountable on said rigid, planar platform, said tray adapted to receive impressionable materials;

a means for aligning said removeable tray with said rigid platform when said removeable tray is mounted on said platform; and

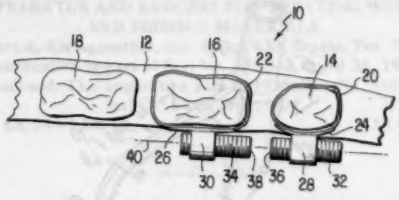
at least one dowel pin holder magnetically attachable to said horseshoe magnet upper surface, said dowel pin holder including a flat, magnetizable bar, said bar having a friction clip disposed at one end, and a dowel pin receiving mandrel frictionally moveable, disposed in said clip, said mandrel being frictionably adjustable in position relative to said clip.

4,017,973

MAGNETIC TOOTH STRAIGHTENER

John E. Nelson, Holtwood, Pa., assignor to HMW Industries, Inc., Lancaster, Pa.

Filed June 16, 1976, Ser. No. 696,511
Int. Cl.² A61C 7/00
U.S. Cl. 32—14 A 14 Claims



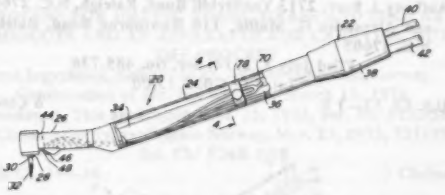
1. An orthodontic assembly for intraoral use comprising a pair of internally threaded tubular members, means connected to said members for mounting them on adjacent teeth in a human mouth, and a pair of screws threadedly received in said members whereby said screws may be advanced and retracted by rotation in said members, said screws being permanently magnetized in a direction parallel to their axes of rotation so that rotation of said screws in said members varies the magnetic force acting between adjacent ends of said screws when mounted on adjacent teeth to vary the orthodontic correction force between the teeth.

4,017,974

HANDPIECE WITH ADJUSTABLE WATER SPRAY

Kurt Sotman, Penn Wynne, and John E. Nash, Downingtown, both of Pa., assignors to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.

Filed Sept. 30, 1974, Ser. No. 510,280
Int. Cl.² A61C 1/08
U.S. Cl. 32—28 11 Claims



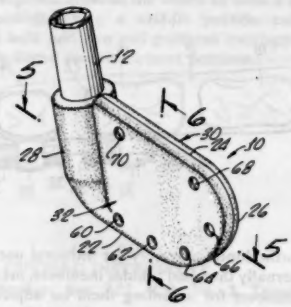
1. For use with a dental handpiece adapted for use with various length cutting burs the improvement comprising means for providing an atomized water spray and for adjusting the direction of the spray to the tip of the bur irrespective of the length of said bur, said means comprising a tube for carrying water and having a free end generally directed at said bur, a first tube for carrying compressed air located laterally of said water tube and having a free end disposed adacent the free end of the water tube, a second tube for carrying compressed air located laterally of said water tube and having a free end disposed adjacent the free end of said water tube, the compressed air and water mixing at the free end of the water tube to create an atomized water spray, and metering means for varying the flow of air through said first air tube and said second air tube to effect the control of the direction of the atomized spray.

4,017,975

SALIVA EJECTOR AND CHIN HOLDER THEREFOR

Wesley Grant Johnson, 1642 Mockinbird Place, Orange, Calif. 92667

Filed Mar. 22, 1976, Ser. No. 669,244
Int. Cl.² A61C 17/04
U.S. Cl. 32—33 35 Claims



1. A combined saliva ejector and tongue restraint adapted to be placed within the oral cavity between the tongue and teeth, said ejector comprising,

a flattened body having upper and lower portions, said body including,

first and second plates in face to face contiguity, at least one of said plates being formed with a recess extending along a surface thereof that faces the other of said plates to define a suction passage between said plates in at least said lower portion,

and means for holding said plates in said face to face contiguity,

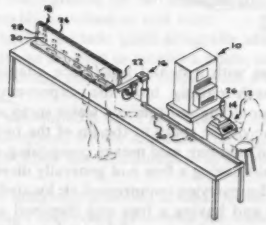
said body being formed with a plurality of apertures communicating with said passage, said body having a height sufficient to extend from the floor of the mouth to said teeth whereby said body may extend along inner sides of said teeth to block contact between said tongue and at least some of said teeth and means formed in at least one of said plates for receiving a vacuum tube in communication with said suction passage.

4,017,976

APPARATUS AND METHOD FOR MAXIMUM UTILIZATION OF ELONGATED STOCK

Anthony J. Barr, 2713 Vanderbilt Road, Raleigh, N.C. 27607, and Alexander G. Mullin, 118 Hawthorne Road, Raleigh, N.C. 27605

Filed July 3, 1974, Ser. No. 485,736
Int. Cl.² G05B 13/00
U.S. Cl. 33—1 S 8 Claims



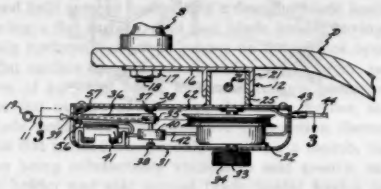
1. A method of selecting the indicators for a backgauge on a cross cut saw or the like to optimize the yield of required usable lengths of stock from a grade mix of stock being processed such as boards of lumber having randomly located unusable lengths containing knots, discoloration or the like, said method comprising: establishing the required lengths and the quantities of pieces of each length to be cut, determining a value factor for each desired length, establishing the probability of having a given length of usable stock in each of the grades of stock, establishing the grade mix of the various grades of stock being processed, determining from said required lengths, required quantities, value factors, probabilities and grade mix, the optimum possible combination of desired lengths for each usable length to be cut into the desired lengths, and visually displaying the optimum combinations of lengths thereby providing the indicators for the backgauge.

4,017,977

TRAILER HITCH ALIGNMENT DEVICE

Glenn M. Light, 15051 Clark Circle, Irvine, Calif. 92705, and Michael V. Richardi, 6561 Britain St., Long Beach, Calif. 90808

Filed Aug. 27, 1975, Ser. No. 607,991
Int. Cl.² B60Q 1/00; G01B 7/28
U.S. Cl. 33—1 LE 12 Claims



1. A trailer alignment device for use in coupling a hitch to a drawbar, comprising:

a housing adapted for attachment to said drawbar;

a spring loaded spool mounted in said housing having the axis of rotation thereof aligned substantially along in vertical direction;

a guide roller mounted for rotation along an axis substantially parallel to the axis of rotation of said spool and in substantial alignment with the point of connection between said hitch and drawbar;

a tubular guide pivotally mounted in said housing about the axis of said roller;

a flexible cable stored on said spool and aligned to pass over a peripheral section of said roller and through said guide;

a potentiometer mounted for articulation by said tubular guide; and

meter means connected to said potentiometer for providing an indication of the displacement thereof.

4,017,978

DEVICE FOR TAKING AN IMPRESSION AND VISUALIZING SAID IMPRESSION

Edouard Peruchon, and Pierre Rabischong, both of Montpellier, France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

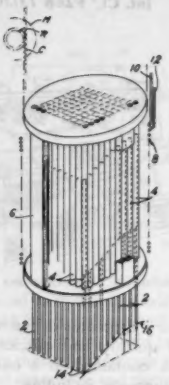
Filed Jan. 19, 1976, Ser. No. 650,402
Claims priority, application France, Jan. 17, 1975, 75.01502
Int. Cl.² G01B 7/28
U.S. Cl. 33—174 L 6 Claims

1. A device for taking an impression and visualizing said impression, wherein said device comprises:

a multidetector constituted by a lattice of N rods, wherein N is a whole number greater than one, each having a ferromagnetic portion, said rods being slidably mounted within N coils, said coils being such as to constitute the N secondary windings of a transformer in which the common primary circuit is formed by a single coil which surrounds the N secondary windings, the primary circuit being supplied with alternating current from a source of alternating current of constant amplitude, the association of a rod with a coil being such as to constitute a detector, wherein the individual positions of said N rods within said N coils are determined by the shape of an external surface of an

object with which the multi-detector is brought into contact,

a multiplexer for sequentially transmitting the N voltages developed at the terminals of the N secondary coils to a visualization means defining at least two coordinates on



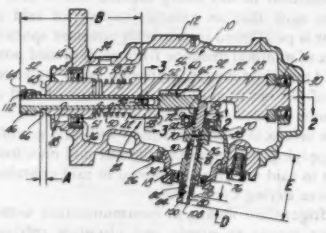
the viewing portion thereof for reconstituting from said N voltages the impression of the object by means of N points, a coordinate of each point indicated on the visualization means being a linear function of the voltage developed at the terminal of the corresponding secondary coil.

4,017,979

BEVEL GEAR SHIMMING GAGE

Herman N. Lenz, Lambertville, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Oct. 9, 1975, Ser. No. 620,925
Int. Cl.² G01B *3/00*
U.S. Cl. 33—174 R **8 Claims**



1. A bevel gear shimming gage for use in conjunction with a bevel gear housing having a first and second stationary bearing in registration with each other, and a third and fourth stationary bearing in registration with each other, said shimming gage comprising:

a first main housing having a bore therein and having a portion adapted to abut against said first bearing,

a first bearing support having a bore therein and having a portion adapted to abut against said second bearing,

a second main housing having a bore therein and having a portion adapted to abut against said third bearing,

a second bearing support having a bore therein and having a portion adapted to abut against said fourth bearing,

first gaging rod means positioned through said first main housing and said first bearing support bores for defining the distance between reference points on said gaging rod means and said first bearing support and between reference points on said gaging rod means and said first main housing, and

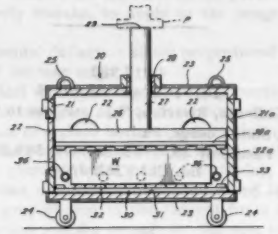
second gaging rod means positioned through said second main housng and said second bearing support bores for defining the distance between reference points on said second gaging rod means and said second bearing support and between reference points on said gaging rod means and said second main housing.

4,017,980

APPARATUS AND PROCESS FOR TREATING WOOD AND FIBROUS MATERIALS

Robert A. Kleinguenther, Rte. 4, Box 433, Seguin, Tex. 78155

Continuation-in-part of Ser. No. 355,342, April 30, 1973, abandoned. This application Jan. 2, 1975, Ser. No. 538,131
Int. Cl.² F26B *5/04, 9/04*
U.S. Cl. 34—13.4 **23 Claims**



1. A process for treating wood comprising the steps of

introducing the wood into a closed chamber,

applying a continuous mechanical force in the range of 1–150 kilograms/square centimeter to at least one surface of said wood,

applying a temperature in the range of 70°–200° Centigrade to said wood,

increasing the atmospheric pressure within said chamber to 2 –45 atmospheres before steam is formed in said wood,

reducing the atmospheric pressure within said chamber and removing the moisturized air from said chamber,

applying a vacuum to said wood when the pressure in said chamber is at approximate room pressure, and

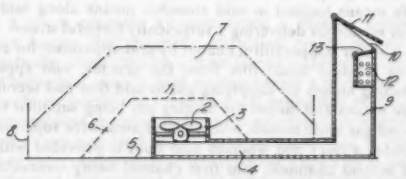
cooling the wood, releasing the vacuum, releasing the mechanical pressure, and removing the wood from the chamber.

4,017,981

PROCESS FOR DRYING YOUNG GRASS AND SIMILAR PRODUCTS AND AN APPARATUS FOR CARRYING OUT THE PROCESS

Bernt Ingvaldsen, Solbakken 43, –N3000 Drammen, Norway

Continuation of Ser. No. 451,793, March 18, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,458
Claims priority, application Norway, Mar. 23, 1973, 731199
Int. Cl.² F26B *3/06*
U.S. Cl. 34—26 **2 Claims**



1. A process for drying goods such as young grass, green fodder, seaweed and similar products having a high moisture content of about 80% by forcing uniformly distributed air through a stationary bed of at least 1 m of the goods to be dried, said air absorbing moisture from the goods in a drying front of 20 to 30 cm, at the forward end of which the air is

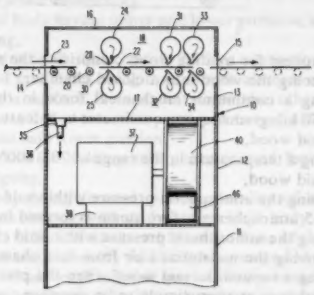
substantially saturated with moisture and produces no further drying, said drying front advancing through the bed as the goods are dried, while using towards the end of the drying process drying air that has been slightly heated to reduce its relative humidity to 35% or less such that the drying of the major part of the goods is completed when the drying front has advanced to the outer surface of the bed, to provide a major inner layer of completely dried goods of about 12% moisture content and an outer minor layer of a thickness of about ¼ to ⅛ the total thickness of the bed but not exceeding 30 cm and having an increasing moisture content of up to approximately 65% and with the humidity of the air emerging from the bed still approximating 100%, and then terminating the drying process and removing the minor layer for drying in another drying process and the major layer as a finished product.

4,017,982

DRYING APPARATUS

Daniel L. Goffredo, Riverton, N.J., assignor to Chemcut Corporation, State College, Pa.

Filed July 28, 1975, Ser. No. 599,597
Int. Cl.² F26B *3/04*
U.S. Cl. 34—31 **5 Claims**



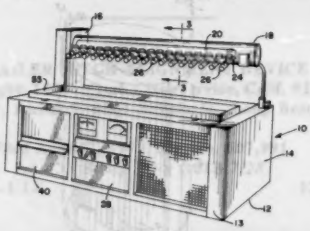
1. Apparatus for drying treated articles following treatment of the articles in such a way that liquid substance remains on the articles, comprising a chamber means, conveyor means in said chamber means for receiving articles with liquid substance on at least one of their surfaces at an inlet of said chamber means and for conveying articles through said chamber means in a forward direction for discharge at an outlet of said chamber means, and gas knife means for drying the articles by removing the liquid substance from the articles through a serial combination of physical impelling and evaporation, wherein said gas knife means comprises first gas knife means located in said chamber means along said conveyor means, for delivering a sufficiently forceful stream of gas at a cooler temperature, substantially unheated by the apparatus, for blowing liquid substance from the articles, and second gas knife means located in said chamber means along said conveyor means for delivering a sufficiently forceful stream of gas at a warmer temperature, heated by said apparatus, for evaporating residual liquid film from the articles; said apparatus including means for supplying gas to said first and second gas knife means and means for heating gas being supplied to said second gas knife means, wherein said means for supplying gas includes a duct and wherein said duct is provided with first and second channels; said first channel being connected for delivering gas to said first gas knife means and said second channel being connected for delivering gas to said second gas knife means, with said heating means being disposed in said second channel for heating the gas by the flow of gas therepast, wherein flow controller means is provided in said duct means for altering the relative proportions of gas being provided to said first and second channels.

4,017,983

FREEZE DRYER

Douglas S. Fraser, New Paltz, N.Y., assignor to FTS Systems Inc., Stone Ridge, N.Y.

Filed May 21, 1975, Ser. No. 579,679
Int. Cl.² F26B *13/30*
U.S. Cl. 34—92 **14 Claims**



1. A freeze drying apparatus of the manifold type particularly adapted for quickly and efficiently dehydrating heat sensitive materials contained in a number of independent containers simultaneously, including

elongated manifold communication having a plurality of ports formed therein, each for commuication with one of said containers containing said material to be freeze dried,

a refrigeration system, comprising a freeze drying condenser means and refrigeration means, being a self-contained system and fluid-tight for the prevention of the entrance of foreign fluids and the exit of refrigerant fluids,

said freeze drying condenser means for subjecting said materials in said containers to extremely low temperatures during a freeze drying cycle,

said condenser means being disposed within said manifold means and extending along the length of said manifold means,

said condenser means being located within said mainifold means such that an exterior surface of said condenser means is positioned in relatively constant spaced relationship and minimal distance from each of said ports formed in said manifold means to provide rapid, uniform sublimation of the material contained in each of said containers in communication with said ports,

vacuum means in communication with said manifold means for applying a vacuum throughout said manifold and said ports to said material contained in said containers during a freeze drying cycle, and

said refrigeration means in communication with said condenser means to supply and circulate refrigerant fluid through said condenser to thereby maintain said condenser means at a low temperature during said freeze drying cycle.

4,017,984

SHOE TYING INSTRUCTIONAL DEVICE

Daniel J. Bonfigli, 88 Hacienda Drive, Tiburon, Calif. 94920

Filed Mar. 22, 1976, Ser. No. 669,186
Int. Cl.² G09B *19/00*
U.S. Cl. 35—8 R **7 Claims**

1. An educational device for teaching one to lace and tie shoes comprising:

a base member;

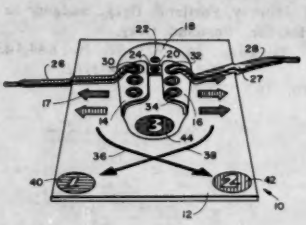
a pair of panel flaps hingedly carried on said base member along generally parallel lines in the nature of the side flaps of a lace-up shoe;

a series of holes along the edge of each of said flaps;

the opposite flaps, in the area around the corresponding holes thereof being of first and second colors, and each flap around holes therein being alternately of said first and second colors;

a shoe lace having the opposite ends thereof in said first and second colors;

paths delineated on said base member in said first and second colors to define the proper disposition of said shoe lace opposite ends for commencing a knot after same has been fully laced;



a point delineated on said base member on which one's finger is to be placed so that one of said lace ends may be looped around said finger for one-half of a bow; and

an area delineated on the other of said lace ends displaced from the extremity thereof to indicate placement of one's finger to push said other lace end through a loop formed by wrapping said other lace end around said one-half bow.

4,017,985

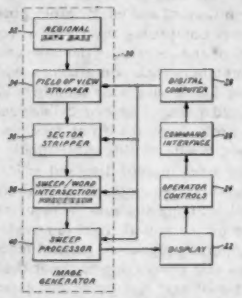
MULTISENSOR DIGITAL IMAGE GENERATOR

Robert A. Heartz, Deland, Fla., assignor to General Electric Company, Fairfield, Conn.

Filed Aug. 22, 1975, Ser. No. 607,063

Int. Cl.² G09B 9/00

U.S. Cl. 35—10.4 **2 Claims**



1. A simulator of a visual image, seen from an elevated viewpoint, of terrain described by a store comprising the three-dimensional coordinates of the endpoints of terrain lines defining the boundaries between terrain planes approximating the surfaces of the terrain and encoded descriptions of the optical characteristics of the surfaces, comprising:

a. means to define a series of sweeps, each in a vertical sweep plane including the elevated viewpoint and its ground position, at successive scan angles measured in a ground plane, the totality of such scans extending over the portion of the terrain to be simulated;

b. means to calculate the coordinates of the intersection with each sweep plane of each terrain line intersecting the sweep plane;

c. means to calculate the tangent of the angle between a reference line extending from the viewpoint in the sweep plane and a view line from the viewpoint to each said intersection;

d. means to compare the said tangent for each intersection with the tangents for the intersections preceding it in range in the sweep plane, measured from the ground position of the observation point, and to produce, responsively to the result of such comparison, an output signal indicating that the view line to the said intersection lies above the view line to any preceding intersection and the said intersection is therefore visible from the viewpoint;

e. means responsive to the said comparator means output signal to store for presentation the coordinates of each visible intersection and the encoded optical characteristics of the terrain planes bounded by it;

f. image formation means adapted to be deflected vertically by a vertical deflection signal and to be deflected horizontally by a horizontal deflection signal, and to produce at any point to which it is thereby deflected a measure of visibility of intensity controllable by an intensity signal;

g. means to receive the data stored for presentation and, responsively thereto, to apply to the image formation means

1. a horizontal deflection signal proportional to the tangent of the scan angle;

2. a vertical deflection signal varying continuously between a minimum and a maximum value during the existence of a given horizontal deflection signal;

3. an intensity signal produced by decoding the encoded optical characteristics stored for display, during the time when the vertical deflection signal lies between values proportional to the tangent for a first visible intersection and the tangent for the next visible intersection bounding the terrain plane having the said encoded optical characteristics, and the horizontal deflection signal has a value proportional to the tangent of the scan angle of the sweep plane in which are the said intersections.

4,017,986

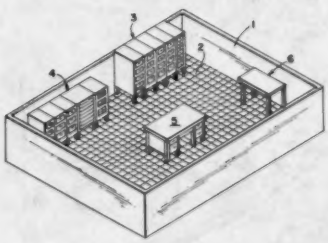
ROOM PLANNING KIT

Charles Miller, 3319 Lonefeather Crescent, Mississauga, Ontario, Canada

Filed Apr. 5, 1976, Ser. No. 673,959

Int. Cl.² G09B 19/00

U.S. Cl. 35—16 **10 Claims**



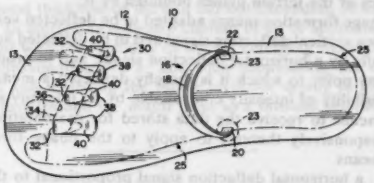
1. A room planning kit comprising a planner mounting surface having first magnetic attraction means adapted to magnetically attract the lowermost lateral surfaces of a plurality of individual models, said models having a horizontal projection in proportion to the horizontal projection of the articles represented thereby, said models adapted to lie entirely in a plane when unfolded and to have surfaces lying in one or more of three planes normal to each other when folded, one of said three planes parallel to said lowermost lateral surface, said lowermost lateral surface having a second magnetically attractive means thereupon, means to selectively maintain said models in a folded three dimensional shape, means to removably apply a layout sheet having a plurality of grid lines thereupon intermediate said planner mounting surface and said lowermost lateral surfaces.

4,017,987

PEDICURE SANDAL

Louis A. Perez, Jr., 5215 N. Blvd., Apt. 107, Tampa, Fla. 33603, and Galina Tatarenko, 486 S. Arnez Drive, Los Angeles, Calif. 90048

Filed Jan. 28, 1976, Ser. No. 653,196
Int. Cl.² A43B 3/12
U.S. Cl. 36—11.5 8 Claims



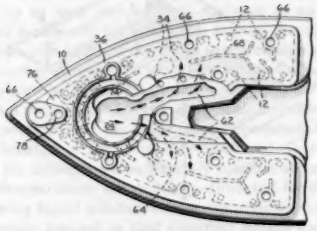
1. A footwear assembly of the type primarily designed for use after pedicure, said footwear assembly comprising: base means including a sole portion configured to correspond to at least a portion of a foot on which said footwear assembly is mounted, foot connecting means interconnected to said base means and disposed in at least partially surrounding relation to the foot, spacer means mounted on said base means and including a plurality of finger elements extending outwardly from said base means between the toes of the foot, each of said spacer means further comprising a plug element mounted on said base means, each of said finger elements having one end integrally attached to said plug element, each of said plurality of finger elements further comprising a free end disposed opposite to the end thereof attached to said plug element, each free end defined by an enlarged surface portion, said plurality of finger elements extending from said plug element and disposed to extend outwardly from said base means into separating relation to the toes of the foot.

4,017,988

SELF-CLEANING STEAM IRON

James P. Coggiola, Pomona, Calif., assignor to General Electric Company, Bridgeport, Conn.

Filed Apr. 7, 1976, Ser. No. 674,636
Int. Cl.² D06F 75/06
U.S. Cl. 38—77.83 4 Claims



1. In a steam iron having steam control means, a fill ooening to an interior water tank, a soleplate with ports, a steam generating boiler and coverplate thereover with steam distribution passages therebetween, and means to purge the iron of water and loose residues including a substantially large first opening in said tank with means operable to control said opening to suddenly dump the water and means conducting the water directly into said boiler, the improvement comprising,

said boiler having at least a pair of separate symmetrical legs extending towards the rear of said iron, each said leg having outlet means extending substantially over the entire one side thereof and communicating with said ports,

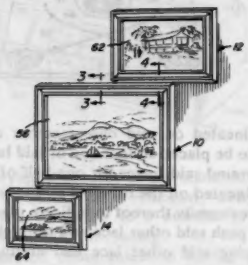
whereby the tank water may be suddenly dumped directly into the boiler to traverse the entire boiler rearwardly through each leg and then through the outlet means to said ports to scrub the entire boiler clear of deposits.

4,017,989

WALL FRAMES WITH INTERLOCKING CLIPS

Douglas J. Murray, Portland, Oreg., assignor to Dimensional Industries, Inc., Portland, Oreg.

Filed Dec. 24, 1975, Ser. No. 644,145
Int. Cl.² G09F 1/12
U.S. Cl. 40—152 4 Claims



1. In combination, a plurality of different size mounting frames each defined by at least three elongated interconnected straight sides having front and rear faces, each side of each of said frames including means defining first and second pairs of opposite end cylindrical recesses opening outwardly of the rear face thereof as well as at least one pair of intermediate cylindrical recesses opening outwardly of the longitudinal mid-portion thereof, the recesses of each pair of recesses being spaced apart the same distance along the corresponding frame side and spaced equally from the outer edge thereof, the juncture between adjacent sides of each frame defining a corner portion thereof and each corner portion including one of said recesses comprising the endmost recess of the corresponding pair of end recesses of the adjacent sides, at least two connecting members each comprising a body member having front and rear faces, said body members each including two laterally spaced pairs of spaced cylindrical projections projecting outwardly from the front face thereof, said frames being disposed in side by side substantially co-planar relation with opposing sides thereof disposed in juxtaposition, one of said body members being positioned with its front side closely opposing and bridging the rear faces of said opposing sides and with the projections thereof removably frictionally telescoped into laterally registered pairs of recesses of said opposing sides, and said connecting member thereby retaining said opposing sides of said frames against lateral separation and against relative longitudinal shifting, the pairs of projections on each body member are disposed in parallel rows of projections and the body member includes a weakened zone thereof paralleling and spaced generally equally between said rows of projections along which said body member may be separated into individual pieces thereof each including one pair of projections, each of said body member pieces including an aperture formed therethrough intermediate the projections supported therefrom.

4,017,990

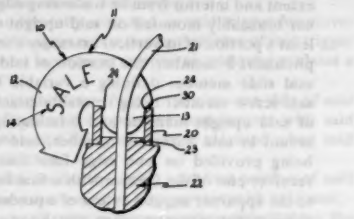
ACCESSORY FOR ARTICLE DISPLAY TALLY

Judd F. Garrison, Grand Rapids, Mich., assignor to John Thomas Batts, Inc., Zeeland, Mich.

Filed Jan. 7, 1976, Ser. No. 646,981
Int. Cl.² G09F 3/00
U.S. Cl. 40—322 7 Claims

1. In combination a suspended article support having a supporting hook and a tubular tally secured to the article support and surrounding the supporting hook, said tally hav-

ing an internal chamber opening through its top, an attachment display member comprising a body member having an indicia receiving arm and an integral foot; said arm having an indicia receiving display surface; said foot depending from



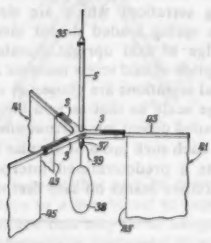
said arm and of a width greater than the inside diameter of said tally; said foot being received in said tally and being bent about said support hook for urging the edges of said foot into tight frictional engagement with the inside wall of said tally.

4,017,991

DISPLAY CLIP FOR POINT OF PURCHASE DISPLAYS

Sol J. Berger, 310 Melvin Drive, Northbrook, Ill. 60062

Filed Aug. 29, 1974, Ser. No. 501,475
Int. Cl.² G09F 7/22
U.S. Cl. 40—128 **13 Claims**



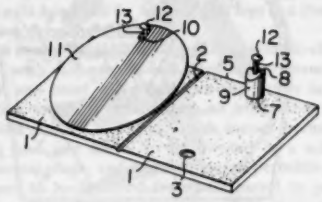
1. A one piece molded article comprising (1) an element having arms uniformly spaced fron one another about a common center, each arm having at its outer end a socket for receiving a display, and said element having means at the common center of the arms for mounting the element and (2) a rod of the same shape at both ends and having means for cooperating with said common center mounting means for supporting the element on the rod and (3) a disc; said element, rod and disc being joined into one unitary structure by frangible bridges that permit molding of the article as a unit and thereafter separating them by fracturing the bridges, each arm comprising a pair of side by side spaced apart parallel side walls extending from said common center, the bottom edges of the side walls being joined at one end of the side walls and the top edges of the side walls being joined at opposite ends of the side walls, and the space between the side walls being open at the end opposite the common center, the means at the center of the mounting element for supporting the element comprising a hole therethrough for receiving either end of the rod, and the means on the rod for supporting the element comprising a shoulder on the rod, said shoulder being adjacent to one end of the rod.

4,017,992

DECORATIVE SHEET

Akira Kajitani, Onojo, Japan, assignor to Toshikiyo Shiraki, Fukuoka, Japan

Filed Aug. 11, 1975, Ser. No. 603,388
Int. Cl.² G09F 7/06
U.S. Cl. 40—138 **9 Claims**



1. A decorative sheet comprising:

a. a base sheet whose surface is divided into a plurality of unit squares defined by continuous vertical and horizontal grooves which intersect at right angles;

b. a plurality of circular support means each said support means mounted on one of said unit squares, said support means having a bottom surface parallel to said base sheet and in contact therewith, and a top surface formed by two intersecting planes at an angle of about 35° to said base sheet;

c. a plurality of circular sheet means, each circular sheet means having a hole therethrough, said hole having straight sides and circular ends, the length of said hole being 2/15 of the length of a side of said unit square and the width being 1/15 of the length of a side of said unit square; and through

d. a plurality of rivets each rivet passing through said hole in one of said circular sheet means and said support means into said base sheet thereby movably mounting said circular sheet means on the top surface of said support mesns said rivet has a hemisphere head having a diameter larger than the width of said hole in said circular sheet and a neck portion with a length and diameter both of 1/15 of the length of a side of said unit square.

4,017,993

ROTARY FILE

H. Coleman Norris, Pewaukee, and Gordon D. Kelly, Elm Grove, both of Wis., assignors to Columbian Art Works, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 467,902, May 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 316,497, Dec. 19, 1972, abandoned. This application Nov. 20, 1975, Ser. No. 633,927
Int. Cl.² G09F 11/02
U.S. Cl. 40—68 **14 Claims**

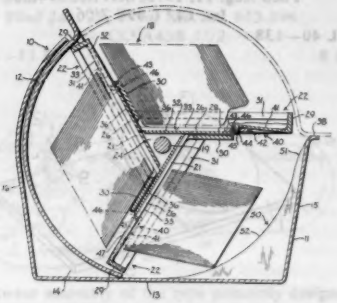
1. A card file wherein the cards are carried by a rotor mounted in a housing for rotation about a horizontal axis, characterized by:

A. the rotor having a plurality of tray carrying arms that project substantially radially from the rotor axis so that upon rotation of the rotor arms point downwardly as they traverse the lower part of their orbit;

B. a plurality of trays, one for each arm, having means thereon to hold a pack of file cards, and having front edges;

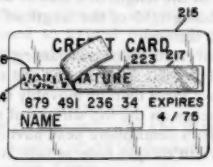
C. cooperating means on the arms and the trays freely slidably connecting the same and constraining the trays to movement along the arms towards and from the rotor axis and hence to and from a position fully engaged with the arms, in which position the front edges of the trays are their radially outermost extremities and travel in a circular orbit substantially concentric with the rotor axis as the rotor is turned; and

D. inwardly facing track means in the lower portion of the housing spaced from the rotor axis a distance such that as



the trays traverse that part of their orbit spanned by the track means the front edges of the trays are contiguous to said track means.

4,017,994
SIGNATURE PROTECTION SYSTEM
Andrew S. Fraser, 120 Ashley Road, Hopkins, Minn. 55343
Filed Aug. 26, 1974, Ser. No. 500,401
Int. Cl.² G09F *3/02*; B42D *15/00*
U.S. Cl. 40—2.2 **2 Claims**



1. An element such as a credit card having a authorized signature which is protected against effacement, alteration or substitution, comprising, in combination:

a surface on the element, at the area intended for the signature, which is recognizable as a warning signal;

an overlay on said surface of masking material, capable of receiving and retaining a signature, which adheres to said surface with a first degree of adhesion;

and a strip of transparent, abrasion resistant material covering said overlay and said signature, and adhering to said layer with a second degree of adhesion greater than that between said overlay and said surface,

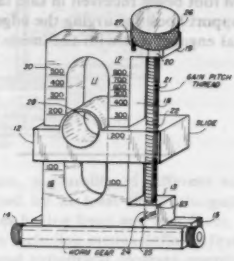
so that after said strip is affixed to said overlay said signature is visible and yet protected from abrasion and alteration, and intentional removal of said strip is accompanied by removal of said overlay to display said warning signal.

4,017,995
RANGE FINDING SIGHT
James B. Hughes, Jr., Houston, Tex., assignor to Deep River Armory, Inc., Houston, Tex.
Filed Mar. 28, 1975, Ser. No. 563,083
Int. Cl.² F41G *1/08*, *1/16*
U.S. Cl. 42—1 S **4 Claims**

1. An open gunsight of rugged construction and suitable for military usage on a firearm having a barrel and a receiver, comprising:

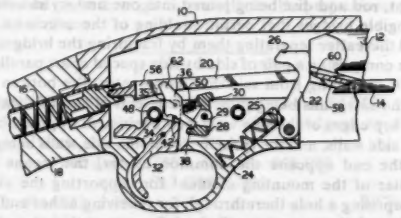
an upright front blade sight portion fixedly mounted on a muzzle end of a firearm;

a rear sight portion laterally translatably mounted toward the receiver end of the barrel of a firearm and comprising a baseplate member and an upright member integral therewith, said upright member having an elongated aperture coextensive over at least a portion of its vertical extent and interior from its transverse edges, a slide member moveably mounted on said upright member over at least a portion of its vertical extent by a co-acting variable pitch screw member, the portion of said aperture above said slide member defining a variable length aperture, said screw member being rotatably attached to one edge of said upright member and terminating in a rotatable mount in said baseplate member, said upright member being provided on one edge face thereof toward the receiver end of the firearm with a first range scale keyed to the apparent angular extent of a predetermined known sized target whereby when the known sized target is



observed through said variable length aperture and said screw member turned to move said slide member until the target height completely fills the vertical extent of said variable aperture, the range to the target may be read off from said range scale, and wherein said screw member is provided on the upper end thereof with a knob portion having on its underside surface a plurality of radially extending serrations which are sized to cooperatively engage a spring loaded detent member housed in the upper edge of said upright member and wherein the variable pitch of said screw member and the separation of said radial serrations are chosen in conjunction with said first range scale so that as said knob is turned and said spring loaded detent jumps from one radial serration into another, each such jump or angular rotation of said knob represents a predetermined interpolation distance between distance marks on said first range scale.

4,017,996
SEAR-DISCONNECTOR FOR FIREARMS
Carl F. Liedke, North Haven, Conn., assignor to O. F. Mossberg & Sons, Inc., North Haven, Conn.
Filed Mar. 4, 1976, Ser. No. 663,866
Int. Cl.² F41C *19/00*
U.S. Cl. 42—69 B **2 Claims**



1. In a firing mechanism for a repeating firearm having a

reciprocal breech-bolt mechanism, a spring-loaded firing member mounted for movement into a cocked position on retraction of said breech-bolt mechanism, a sear resiliently urged into a cocking position for cocking said firing member, and a trigger for moving said sear out of such cocking position, a sear-disconnecting device comprising,

a disconnector pivotally mounted on said trigger for movement therewith upon retraction and release of said trigger and for pivotal movement relative to said trigger about a pivot axis,

said disconnector having a foot portion on one side of said pivot axis disposed for operative engagement with said sear such that said firing member is released when said trigger is retracted,

spring means for resiliently urging said foot portion of said disconnector into operative engagement with said sear,

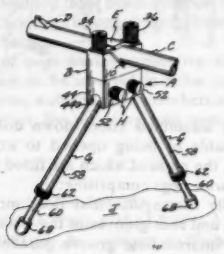
said disconnector having a finger portion disposed on the opposite side of said pivot axis from said foot portion and extending into the path of said breech-bolt mechanism for movement thereby against the urging of said spring means when said breech-bolt mechanism is retracted, said foot portion being thereby moved to an inoperative position out of engagement with said sear such that said sear is free to return to its cocking position.

4,017,997

PORTABLE GUN SUPPORT

Donald C. Peterson, South Gate, and Jack C. Snyder, Yorba Linda, both of Calif., assignors to Donald C. Peterson, South Gate, Calif.

Filed July 25, 1975, Ser. No. 599,170
Int. Cl.² F41C 29/00
U.S. Cl. 42—94 **1 Claim**



1. A portable gun support that may be removably secured when in a first position to a gun barrel to support the latter from a stationary surface that may be of irregular configuration to shoot in a substantially horizontal direction, said gun support when not in use capable of being disposed in a compact second position where it may be carried conveniently in the pocket of a garment worn by a user of said gun support, said gun support including:

a. a block having a transverse padded groove of V-shape formed therein, said groove permitting gun barrels of different diameter to be disposed therein;

b. first padded means for removably locking said block to said gun barrel when the latter is disposed in said groove, said first means including a padded cross piece pivotally supported from said block and capable of being disposed in a first position to removably engage said barrel when the latter is disposed in a groove; and a lock for removably holding said cross piece to engage said barrel;

c. a head;

d. a pair of legs, each of said legs including first and second tubular sections, said second section being telescopically movable in said first section;

e. second means on each of said legs for removably locking said second sections at a desired longitudinal position relative to said first sections, said second means including:

1. threads formed on the free ends of said first leg sections;

2. two nuts that engage said threads, said nuts having inwardly extending lips; and

3. two resilient rings that rest on said lips and are expanded radially to frictionally grip said second sections when said nuts are tightened by rotating said nuts relative to said threads;

f. third means for pivotally supporting said first leg sections from said head and for locking said legs at a desired angle relative to one another;

g. fourth means for pivotally supporting said block from said head, with said second and third means permitting said block and head when said gun support is in said first position to be supported from an irregular or angularly inclined surface and said fourth means permitting said block and gun barrel to be pivoted in a substantially horizontal plane, and said first means permitting said gun support to be removed from said barrel to permit said third and fourth means to be used to dispose said gun support in said second position where said second leg sections are telescoped substantially into said first leg sections, with said legs adjacently disposed to one another; and

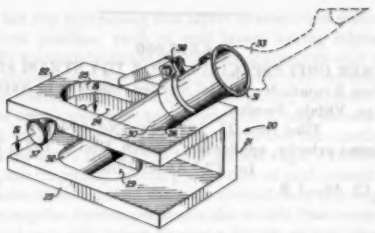
h. resilient tips mounted on free ends of said second sections.

4,017,998

FISHING ROD HOLDER

Donald C. Dumler, 3623 W. North Lane, Phoenix, Ariz. 85021

Filed Jan. 28, 1976, Ser. No. 652,989
Int. Cl.³ A01K 97/10
U.S. Cl. 43—21.2 **6 Claims**



1. A fishing rod holder for detachably engaging the handle of a fishing rod and supporting said rod in selective positions, said fishing rod holder comprising:

a. a frame;

b. a tubular socket including:

i. a lower end pivotally connected to said frame for rotation about a horizontal axis, and

ii. an open upper end for receiving the handle of a fishing rod;

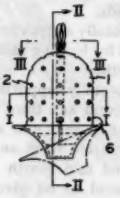
c. means carried by said socket for operatively securing said handle within said socket;

d. detent means carried by said frame and engageable with said socket for selectively retaining said socket in a first locked position;

e. stop means carried by said frame for limiting the pivotal movement of said socket and supporting said socket in a second position; and

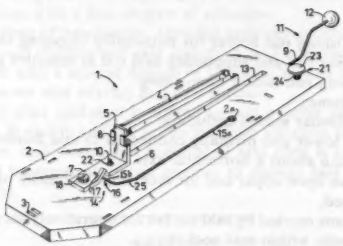
f. said tubular socket means being permitted unrestricted pivotal movement from said second position to said first position and actuating said detent means to said first locked position when said tubular socket is pivoted from said second position to said first position.

4,017,999
FISH-FEEDER
Sakae Muko, 515, Kamitsutsui, Oonojo, Fukuoka, Japan
Filed July 11, 1975, Ser. No. 595,245
Int. Cl.² A01K *97/02*
U.S. Cl. 43—44.99 **1 Claim**



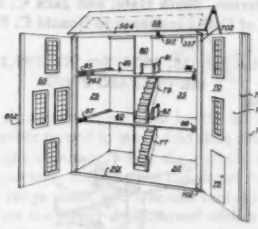
1. A fish-feeder comprising a bell-shaped container having a peripheral bottom, said bell-shaped container having a plurality of apertures formed along the entire outer surface thereof, a bottom lid for discharging bait from said container, said bottom lid having a peripheral brim which is in contact with the entire peripheral bottom of said container when said lid is closed, connecting means tightly and releasably connecting said container and said bottom lid whereby bait is adapted to be contained in said container when the lid is in a closed position and to be released from the container when the lid is opened, said connecting means comprising a hinge means and a latching means, said hinge means pivotally securing said bottom lid to said container, said lid having a sleeve extending transversely thereof, said latching means comprising a suspending means on said container which is shaped like a pincette having a distal end formed as a generally inverted U-shaped configuration for holding said sleeve and said bottom lid in a closed position, said pincette being adapted to release said sleeve to thereby open said lid to discharge said bait from the container.

4,018,000
BURNER UNIT ESPECIALLY FOR TOY STEAM ENGINES
Jockum Krumlinde, Vittsjo, Sweden, assignor to Aktiebolaget Alga, Vittsjo, Sweden
Filed Nov. 21, 1975, Ser. No. 634,199
Claims priority, application Sweden, Dec. 6, 1974, 7415337
Int. Cl.² A63H *19/06*
U.S. Cl. 46—1 R **7 Claims**



1. A burner unit adapted for use with toy steam engines and the like comprising:
a base plate having an elongated slot;
an operating assembly comprising a slidable lever disposed along said slot and having an actuating end extending through said slot and an actuatable handle extending beyond one end of the base plate;
slide means icluding a slide member movable along the base plate and having one end thereof affixed to said lever actuating end;
said slide means including means extending into said slot and displaced from and cooperating with said lever actuating end for maintaining alignment of said slide with said slot;
said slide means further having a receptacle mounted upon said slide member and movable therewith whereby said slide member and hence said receptacle are reciprocally movable between end positions substantially coinciding with the ends of said slot;
spring biased locking means normally engageable with said slide means when said slide means is in one of said end positions to prevent movement of said slide means towards the remaining end position;
said locking means including manually operable means movable against the biasing force to displace said locking means from said slide means to realease and thereby permit movement of said slide means.

4,018,001
DOLL HOUSE
Harry E. Walmer, 721 N. Overlook Drive, Alexandria, Va. 22305
Filed Sept. 23, 1975, Ser. No. 615,896
Int. Cl.² A63H *3/52*
U.S. Cl. 46—19 **6 Claims**



1. An easily assembled knock-down doll house having a front wall capable of being opened to expose the interior rooms thereof, the parts of which are fitted together and held together only with pegs comprising:
a. a generally rectangular first floor member comprising left, right, and rear grooves in the top surface thereof, at least one intermediate groove parallel to said left and right grooves, and a pair of upstanding peg means in the left and right front corners;
b. a rear wall member having a size and shape adapting it to have its bottom edge engage said rear groove of said first floor member, comprising vertical L-shaped side beams and a top horizontal beam member disposed on the inner front wall containing at least one vertical slot;
c. left and right side wall members having respective sizes and shapes adapting them to have their rear edges engage said L-shaped beams of said rear wall and their bottom edges engage said respective left and right grooves of said first floor, each of said side walls containing a top, inner horizontal beam member having an inward side groove, at least one inner horizontal beam member having an inward side groove disposed between said top beam and the lower edge of said wall; each of said side walls comprising inwardly angled top edges, and a slot disposed at the terminus of said angled top edges;
d. at least one intermediate wall member having a size and shape adapting it to have its lower edge engage a respective said intermediate groove in said first floor and a said vertical slot of said rear wall top beam member, comprising at least one intermediate horizontal slot extending rearwardly from the front edge;
e. at least one intermediate floor member having a size and shape adapting it to have its side edges engage said grooves of said horizontal beam members of said side

walls and comprising a stairwell near the rear edge porion thereof containing an opening to said rear edge and at least one horizontal slot extending forwardly from the rear edge, said slot being positioned to register with a said horizontal slot of said intermediate wall member;

f. a top floor member having a size and shape adapting it to have its side edges engage said grooves of said top horizontal beam member of said side walls, and comprising a top horizontal beam member disposed across the front edge of said top floor, arm members containing hole means extending from each of the end extremities of said top floor beam members;

g. front and rear roof panels each comprising a horizontal beam member disposed along the underportion of one edge containing a slot near each end, said roof panels being constructed and arranged to adapt said roof beams to enter said terminus slots of said side walls and the slots thereof to receive the edges of said terminus slots, said respective roof beams disposed adjacent to each other and said panels disposed along said angled edges of said side walls;

h. front wall means comprising left and right sections, said left section comprising left and center vertical beams disposed at the vertical edges thereof, said left vertical beam comprising vertical hole means in the top and bottom ends; said right section comprising right and center vertical beams disposed at the vertical edges thereof, said right vertical beam comprising vertical hole means in the upper and lower ends; said left and right sections having respective sizes and shapes adapting them to have said respective bottom vertical holes engage said respective upstanding pegs of said first floor members, and retaining means adapted to be disposed through said respective top holes when aligned with respective holes in said arm members of said top floor beam member, whereby said left and right sections can be opened and closed across the front of said doll house;

i. a plurality of pegs having respective sizes and shapes adapting them to be inserted in holes contained in said beams, grooves, wall and floor members at their junctures with each other for retaining said assembled structure together.

4,018,002

TOY SIMULATING A WALKING ANIMAL

John Holden, Mount Joy, Pa., assignor to Hasbro Development Corporation, Pawtucket, R.I.

Continuation of Ser. No. 518,621, Oct. 29, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 644,247

Int. Cl.² A63H *13/02*

U.S. Cl. 46—105 **8 Claims**

7. A toy simulating a walking animal, comprising a body, a front axle mounted on said body and having front wheels secured to the outer ends thereof, a rear axle mounted on said body in spaced relation relative to said front axle and having rear wheels secured to the outer ends thereof, a lever simulating a leg of said animal secured to each of at least an opposed pair of said wheels in offset eccentric relation with respect thereto and being movable upon rotation of said wheels in a direction relative thereto, a pulley mounted on one of said axles for rotation therewith interiorly of said body, a draw-string wound on said pulley and extending exteriorly of said body for manipulation by the user of said toy, a reduced pin mounted in the interior of said body in parallel relation to said axles and spaced from the axle on which said pulley is mounted, a tension spring having one end secured to said pulley and the other end fixed to said pin, wherein rotation of said pulley by withdrawal of the draw-string from said body winds said spring on said pulley under tension, and release of said draw-string causes said spring to unwind from said pulley onto said pin, thereby rotating said pulley and the axle on which the pulley is mounted for producing rotation of the wheels on which said pulley is mounted, wherein a corresponding propelling motion of said body on said wheels is produced that causes said legs secured to said wheels to move relative thereto for simulating a walking action of said toy.

4,018,003

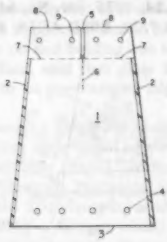
HOT CAP

Walter Mirecki, c/o Anthony J. Pieragostini, Esq., 61 Smith Ave., Mount Kisco, N.Y. 10549

Filed Apr. 14, 1976, Ser. No. 677,014

Int. Cl.² A01G *13/00*

U.S. Cl. 47—26 **8 Claims**



1. A hot cap comprising two layers of semi-rigid material in juxtaposed position, each of said layers having edges in a generally trapezoidal shape with a first continuous edge parallel to a second edge having a length shorter than the length of said first continuous edge, a third edge joining one free end of said first continuous edge to one free end of said second edge, a fourth edge joining the other free end of said first continuous edge to the other free end of said second edge, a rectangular knotch interruptingly severing a portion of said second edge intermediate and midway the ends thereof, two side edges of said rectangular knotch perpendicular to said first continuous edge, said two side edges having a length greater than the length of said interrupted portion in said second edge, said interrupted portion in said second edge having a length equal to the length of the remaining edge of said rectangular knotch, a first line in the surface of each layer of said semi-rigid material alongst which said semi-rigid material is weakened extending to said third edge at one end thereof and to said fourth edge at the other end thereof, said first line parallel to said second edge and passing through said remaining edge of said rectangular knotch, a second line in the surface of each layer of said semi-rigid material alongst which said semi-rigid material is weakened, said second line having one end terminating midway along the length of said remaining edge of said rectangular knotch, said second line perpendicular to said second edge and said remaining edge of said rectangular knotch, the other end of said second line intermediate said first line and said first continuous edge, means to join a portion of the interstitial surfaces adjacent said third edges of each of said layers together, means to join a portion of the interstitial surfaces adjacent said fourth edges of each of said layers together, said joined portion of said third edges extending from one end of said first continuous edge to the first end of said first line, said first end of said first line terminating at said third edges, said joined portion of said fourth edges extending

from the other end of said first continuous edge to the second end of said first line, said second end of said first line terminating at said fourth edges, a plurality of holes piercing through each layer of said semi-rigid material wherein each hole is centered along a third line parallel to said first continuous edge, said third line intermediate said first continuous edge and said first line, four holes piercing coaxially through each of said layers of said semi-rigid material wherein each of said four holes are centered on a fourth line, said fourth line parallel to and intermediate said second edge and said first line, two of said four holes lying intermediate said third edge and a fifth line coextensive with said second line extending through said interrupted portion of said second edge, second two of said four holes lying intermediate said fourth edge and said fifth line.

4,018,004

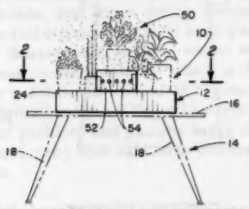
HUMIDIFYING PLANT TABLE

Anita Soffer, 14968 Dickens St., Sherman Oaks, Calif. 91403

Filed Dec. 24, 1975, Ser. No. 644,081

Int. Cl.² A47G 7/00; B01D 47/16; F24F 3/14

U.S. Cl. 47—39 3 Claims



1. A humidifying plant table comprising:

a housing having first opening means therein, an internal chamber located within said housing, said opening means providing access into said internal chamber, said housing having a top surface and a bottom surface interconnected by sidewalls, said first opening means being located within said top surface with plants being adapted to rest upon said top surface, said first opening means comprises a substantial number of separate openings of equal size;

a quantity of liquid adapted to be located within said internal chamber but not filling said internal chamber so as to leave a space above the level of the liquid, said first opening means communicating with said space; and

mist producing means connected to said housing and including a liquid supply tube extending to below the level of liquid within said internal chamber, said mist producing means additionally comprising means to rotate said tube and cause the water picked up by said tube to be formed into fine mist droplets, whereby upon activation of said mist producing means said fine mist droplets are conducted into the proximity of any plants which are placed upon said top surface of said housing, said mist producing means further comprising an electric motor centrally mounted upon said top surface, a cover attached to said housing and located about said motor, said cover including a plurality of second openings therein in order to provide access of air to said motor, said second openings being physically located substantially above the plane of said top surface of said housing; and

a motor housing closely surrounding said motor and located within said cover, said motor housing having third openings therein to provide access of air directly into said motor.

4,018,005

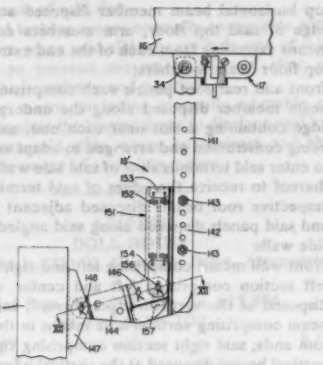
DRAWBAR ARM FOR DOOR OPERATOR

Donald S. Harris, Dallas, Tex., assignor to Overhead Door Corporation, Dallas, Tex.

Filed Dec. 24, 1975, Ser. No. 644,194

Int. Cl.² E05F 15/16

U.S. Cl. 49—199 9 Claims



1. In a door operator for moving a door between a closed position wherein the door extends substantially vertically and closes a door opening and an open position wherein the door extends substantially horizontally and is disposed adjacent the upper edge of the door opening, said operator including elongated guide means extending in a substantially horizontal direction away from the door opening, carriage means engaged with said guide means and movable therealong, a drawbar assembly connected between said carriage means and said door, and motor means drivingly interconnected to said carriage means for moving same along said guide means to result in movement of said door between said open and closed positions, comprising the improvement wherein said drawbar assembly includes a first arm member hingedly connected to said carriage means at a first pivot axis, a second arm member hingedly connected to said door at a second pivot axis which is substantially parallel to but spaced from said first pivot axis, said first and second arm members being hingedly connected together for relative pivotal movement therebetween about a third pivot axis which is substantially parallel to but spaced from said first and second pivot axes, and spring means connected between said first and second arm members for permitting relative movement therebetween.

4,018,006

SPINNING JET BLASTING PLANT FOR CLEANING SHAPED WORKPIECES

Johann Moelders, Cologne, Germany, assignor to Berger Maschinenfabriken G.m.b.H. & Co., Bergish-Gladbach, Germany

Filed Nov. 17, 1975, Ser. No. 632,786

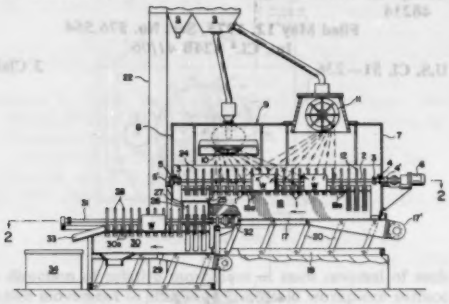
Claims priority, application Germany, Nov. 20, 1974, 2454866

Int. Cl.² B24C 3/00

U.S. Cl. 51—9 R 10 Claims

1. Apparatus for jet blasting workpieces comprising a housing, an elongated cage axially rotatable in said housing for containing the workpieces during blasting and having longitudinally spaced rings, means mounted on the housing for axially rotating said cage, means for jetting a blast medium onto said

workpieces in said cage, a series of arms mounted in said housing and extending between said rings for engaging said



workpieces, and means for oscillating said arms to move said workpieces axially through the cage as it rotates.

4,018,007

APPARATUS FOR GRINDING SURFACE PORTIONS OF THICK PLATES

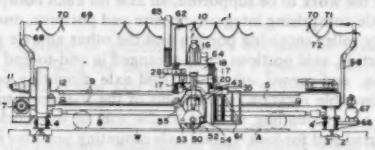
Tetsuro Oshimi, Nagoya, Japan, assignor to Nippon Toki Kabushiki Kaisha, Japan

Division of Ser. No. 572,822, April 29, 1975. This application Nov. 10, 1975, Ser. No. 630,529

Claims priority, application Japan, May 2, 1974, 49-50030

Int. Cl.² B24B *7/02*

U.S. Cl. 51—33 R **2 Claims**



1. An apparatus for grinding surface portions of thick plates comprising parallel pair rails spaced a broad distance apart from each other, a gate-shaped wagon supported on and movable along said rails, and a transversal grinding unit supported on and movable along a transversal beam provided in said wagon, said grinding unit including a stationary frame, a transversal beam movably supported on said stationary frame, a hollow cylindrical member secured to a central front portion of said second-mentioned transversal beam, a shaft member rotatably received in said cylindrical member, fork-shaped pair frames fixed to and depending from the lower end of said shaft member, a vertically pivotable frame pivotably supported between the lower ends of said fork-shaped pair frames, a bearing sleeve secured to a front portion of said vertically pivotable frame, a grinder wheel shaft carrying a grinding wheel and rotatably received in said sleeve, means for swing said fork-shaped pair frames about an axis of said shaft member, cam means providing a gap, said cam means being mounted on the underside of a base member secured to the top of said cylindrical member receiving said shaft member, a roller capable of rolling along said gap in said cam means, said roller being rotatably supported on the top of a L-shaped vertically pivotable link pivoted to the top of said fork-shaped pair frames, the other end of said vertically pivotable link being linked via an air cylinder to a front upper portion of said sleeve.

4,018,008

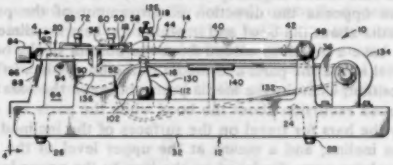
LAPPING DEVICE

Francis M. Young, 13628 37th Ave. South, Seattle, Wash. 98168

Continuation of Ser. No. 366,596, June 4, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 558,777

Int. Cl.² B24B *15/00*

U.S. Cl. 51—26 **14 Claims**



1. Lapping device for abrasively grinding two work pieces together to form a matched fit thereof, comprising:

a. a supporting base,

b. a first clamping assembly on said base for holding one work piece and being designed for generally vertically reciprocable movement, said first clamping assembly including a generally flat first surface on which said one work piece is supported and a first clamping plate for bearing down on and holding one work piece in place on said first surface, said first plate being shaped so as to allow access to an overhanging edge portion of said one work piece,

c. a second clamping assembly positioned for holding another work piece against said one work piece, said second clamping assembly being vertically stationary and mounted for generally horizontal movement towards and away from said first clamping assembly, said second assembly including a second clamping plate for bearing down on and holding said other work piece in place on generally flat second surface, said second plate being shaped generally like said first plate so as to allow access to an overhanging edge portion of said other work piece,

d. means for driving said first clamping assembly through an up-and-down stroke generally perpendicular to said flat first and second surfaces for a predetermined distance movement so that said work pieces are not out of contact with each other while being worked, and

e. said second clamping assembly including resilient means for biasing the same towards said first clamping assembly to resiliently urge said work peices together.

4,018,009

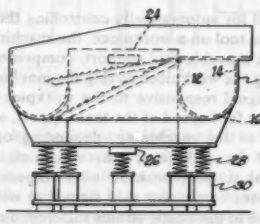
VIBRATORY FINISHING DEVICE

Raymond M. Leliaert, South Bend, Ind., assignor to Wheelabrator-Frye, Inc., New York, N.Y.

Filed June 9, 1975, Ser. No. 584,760

Int. Cl.² B24B *31/06*

U.S. Cl. 51—163.2 **19 Claims**



1. In a finishing device having an annular bowl adapted to contain a charge of treating media and work pieces or parts of larger cross-sectional dimension than the media, and means

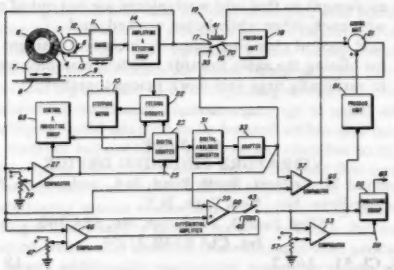
for vibrating said bowl to cause the media and parts to travel circumferentially about the bowl, a means for unloading the parts without removal of the media from the bowl comprising a plurality of elongate rigid bars spaced one from the other across the bowl by an amount greater than the cross-sectional dimension of the media but less than the cross-sectional dimension of the parts, means mounting the bars for rocking movement between a raised position above the level of the parts and media in the bowl and a lowered position in which the bars extend angularly downwardly into the bowl in a direction opposite the direction of movement of the parts and media about the bowl and in which the bars are dimensioned to have a length to extend from the bottom of the bowl to a level above the parts and media in the bowl when in lowered position, whereby the media passes between the bars for continued excursion about the bowl while the parts are diverted by the bars for travel on the surfaces of the inclined bars up the incline, and a means at the upper level of the bars for receiving parts displaced on the bars to the upper level.

4,018,010

METHOD AND RELATIVE APPARATUS FOR CONTROLLING AND REGULATING THE WORKING CYCLES OF A MACHINE TOOL

Mario Pozzetti, Bologna, and Roberto Rossi, Sofia, both of Italy, assignors to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy

Filed Apr. 8, 1975, Ser. No. 566,674
Claims priority, application Italy, May 9, 1974, 3378/74
Int. Cl.² B24B *49/16*
U.S. Cl. 51—165.71 **13 Claims**



1. Method for automatically controlling the working cycles of a machine tool on a workpiece, the machine tool including a tool and a movable tool support, comprising:

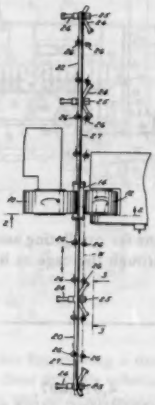
measuring the workpiece during the machining for generating a signal responsive to the workpiece size; programming the feed speed of the tool support, at least in the last phases of the machining, depending on the measured sizes of the workpiece; generating a signal responsive to the tool support position with respect to a reference condition; comparing said signals to obtain a signal responsive to the elastic strains suffered, during the machining, by the kinematic chain including the workpiece and the tool, as a consequence of the tool thrust; and changing the programmed feed speed of the tool support depending on said signal responsive to the elastic strains.

4,018,011

CENTERLESS GRINDER WORK SUPPORT AND BOOTY ROLLER THEREFOR

George R. Whittenberg, 11860 Freud Ave., Detroit, Mich. 48214

Filed May 12, 1975, Ser. No. 576,554
Int. Cl.² B24B *41/06*
U.S. Cl. 51—236 **3 Claims**



1. In a centerless grinder work support having an elongated floor supported guide tube adapted to extend along beneath a work piece to be machined in the grinder and with a plurality of upwardly extending V-shaped supports arranged on the guide tube in spaced relation therealong with the arms of the V disposed on opposite sides of the work to be supported, a pair of work supporting booty rollers mounted in confronting cooperative work supporting relation on the arms of each V-shaped support with the axes of the rollers skewed to the axis of the work to be supported, an axle for each booty roller, said axle comprising integral opposite end portions, one being a booty roller receiving portion and the other an axle mounting portion, said portions being arranged in end-to-end angled relation, and means supporting said axle mounting portions for adjustable rotation on the arms of the V-shaped supports about axes extending parallel to the axis of the work to be supported and for locking said axle mounting portions in fixed positions on such arms, whereby the skew angle of the booty roller receiving portion may be adjustably fixed relative to the work to be supported.

4,018,012

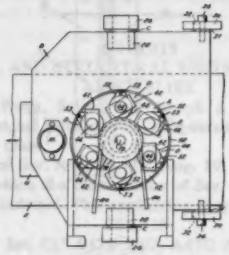
METHOD OF GRINDING METAL BILLETS, BLOOMS OR SLABS

Richard G. Hopkins, Bennington Township, Shiawassee County, Mich., and Paul E. Stockhausen, Canfield, Ohio, assignors to MWA Company, Owosso, Mich.

Continuation-in-part of Ser. No. 405,298, Oct. 11, 1973, Pat. No. 3,874,123. This application Mar. 7, 1975, Ser. No. 556,398
Int. Cl.² B24B *1/00*
U.S. Cl. 51—281 R **2 Claims**

1. A method of removing metal from the surface of a metal workpiece such as a steel slab, bloom or billet, comprising supporting a plurality of grinding wheels in spaced relation about an axis extending transversely of said surface, holding said grinding wheels in contact with said surface under a yielding pressure so that each grinding wheel can follow the contour of said surface independently of the others, rotating said grinding wheels about their own axes, orbiting said grinding wheels as a group about said first-mentioned axis, relatively moving said plurality of grinding wheels and said workpiece back and forth in directions parallel to said workpiece

surface, and simultaneously tilting said plurality of grinding wheels one way and then the other about an axis transverse to



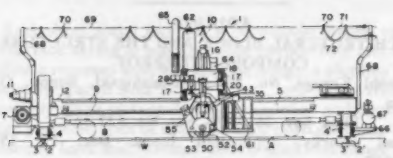
the direction of relative movement at each reversal of such relative movement so that they grind said workpiece surface with a negative rake.

4,018,013

METHOD FOR GRINDING SURFACE PORTIONS OF THICK PLATES

Tetsuro Oshimi, Nagoya, Japan, assignor to Nippon Toki Kabushiki Kaisha, Japan

Filed Apr. 29, 1975, Ser. No. 572,822
Claims priority, application Japan, May 2, 1974, 49-50030
Int. Cl.[2] B24B *1/00*
U.S. Cl. 51—281 R **1 Claim**



1. A method of grinding surface portions of thick steel plates comprising the steps of moving a grinding wheel rotating on a horizontal axis into grinding engagement with the surface of a workpiece disposed in a horizontal plane, oscillating said grinding wheel throughout a path extending in a horizontal direction, maintaining said grinding wheel rotating on said horizontal axis in grinding engagement with said workpiece surface throughout all but the end portions of said path, raising said grinding wheel out of said grinding engagement with said workpiece surface during the reversal of direction of said grinding wheel along said path end portions during said oscillating movement and lowering said grinding wheel into grinding engagement with said workpiece surface along the said path between said path end portions upon completion of said reversal of direction of said grinding wheel at each end of said path.

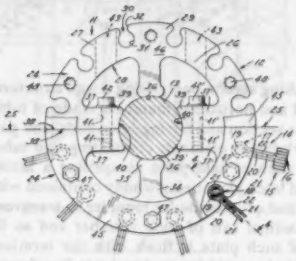
4,018,014

HUB STRUCTURE FOR ROTARY FINISHING WHEELS

James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.

Filed May 7, 1976, Ser. No. 684,440
Int. Cl.[2] B24D *13/06*
U.S. Cl. 51—337 **32 Claims**

1. A hub structure for a rotary finishing wheel having a rotational axis and being adapted for replaceably mounting a plurality of circumferentially spaced pack units each of which includes a flap-like member of fill material having a radially outer finishing portion for engaging a workpiece and a radially inner slot-engaging portion for mounting said pack unit, said hub structure comprising two substantially identical hub sections generally representing the two halves of a longitudinally bisected cylinder, the radially outer surface of each of said hub portions having a generally semi-circular exterior contour provided with a plurality of integrally-formed, circumferentially-spaced, quasi-cylindrical, key-hole-type, slot-forming means each having a longitudinal slot axis parallel to said rotational axis, each of the longitudinal slots defined by said slot-forming means being adapted to slideably and telescopically receive the slot-engaging portion of said flap-like member to mount the pack unit for limited hinge-type pivotal movement about said slot axis, the interior of each of said hub portions including an integrally-formed, centrally-disposed, radially inwardly extending member having its inner end adapted to form a clamp seat having the general contour of the shaft to which said hub structure is to be secured, said member being generally normal to the plane of bisection of



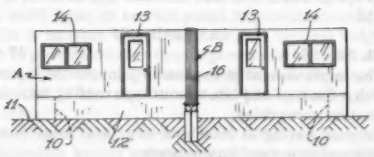
said hub portions, the interior of each of said hub portions further including a pair of flange portions generally parallel to said plane of bisection and integral with the longitudinally bisected edge portions of the hub portion, said flange portions extending radially inwardly toward one another and each having its radially inner end adapted to form onehalf of another shaft-engaging seat, said hub structure further including means for adjustably securing each of said pair of flange portions of one hub portion to corresponding opposed flange portions of the other hub portion to form a pair of oppositely disposed shaft-engaging seats from said flange portions while securely clamping said shaft between the clamp seats of the oppositely disposed members of the two hub portions to secure said hub structure to said shaft for rotation therewith and means for removeably retaining the slot-engaging means of said flap-like members axially within said longitudinal slots.

4,018,015

TRAILER ANCHORING DEVICE

Gladys B. Swanson, P. O. Box 403, Shevlin, Minn. 56676

Filed Oct. 20, 1975, Ser. No. 623,774
Int. Cl.[2] E04D *1/34*; E02D *5/80*
U.S. Cl. 52—23 **1 Claim**



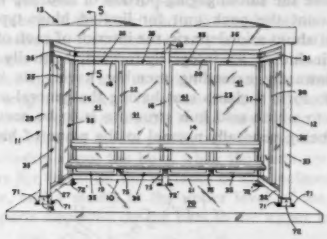
1. A trailer anchoring device including a belt extending over the top of the trailer and down the sides thereof, an anchoring block on each side of the trailer, a transversely extending bar at each end of the belt, said bars extending longitudinally of said trailer and extending transversely beyond said belt, three anchoring rings extending upwardly from anchoring block, a pair of means connecting said bars to the anchoring ring most remote from the end of said belt, an independent means securing the ends of said bars to the remaining anchoring means.

4,018,016

WAITING STATION FOR BUSES

Theodore R. Zale, 160 E.65th St., New York, N.Y. 10021

Filed Feb. 6, 1976, Ser. No. 655,728
Int. Cl.² E04H *1/12*
U.S. Cl. 52—36 5 Claims



1. A waiting station comprising a wall structure constructed of vertical and horizontal members made of tubing of rectangular cross-section and having open ends, and pairs of cooperative interlatching elements connecting said tubular members together, each of said pairs comprising a latch plate and a catch, said latch plate being wholly contained within the opening in an end of one tubular member in transverse relation to the longitudinal axis of such member and so that the outer surface of such plate is flush with the terminal end of the tubular member, said latch plate extending from one side wall of said tubular member and the area of such latch plate being less than the area of said opening so that such opening is only partially closed by such plate to provide a space between one free side of such plate and the side wall of said tubular member opposite said one side wall thereof, and said catch being constituted of a member having one end portion secured to a side wall of a second tubular member intermediate the terminal ends of the latter and having its other end portion spaced from and in substantial parallelism with such surface, said other end portion being disposed in opposed relation to said latch plate and being insertable through said space adjoining the free side of said latch plate, and after being so inserted interlatchable with said latch plate, said latch plate and catch, in interlatched condition, being entirely concealed by the connected end of said one tubular member and said side wall of the second tubular member.

4,018,017

EXPANSION JOINT MEANS

Traugott K. Schoop, Mellinger Strass 48, 5401 Baden, Switzerland

Filed Apr. 23, 1975, Ser. No. 570,963
Claims priority, application Germany, Apr. 25, 1974, 7414474[U]; June 19, 1974, 2429430; Mar. 21, 1975, 2512655
Int. Cl.² E04D *1/35*
U.S. Cl. 52—58 17 Claims

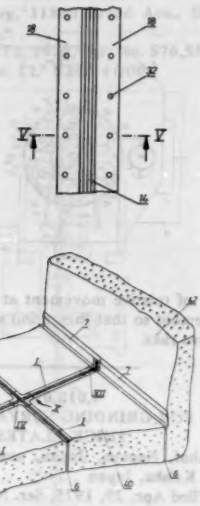
1. The improvement in expansion joint means in combination with a flat roof and bituminous type roofing material, said combination comprising:

a flat roof having at least one structural joint formed by adjacent structural components,

expansion joint means for bridging said joint and including a centre portion made solely of stretchable synthetic rubber and two parallel side portions integrally connected respectively on opposite longitudinal sides of said centre portion and being made of substantially unstretchable material including synthetic rubber, the centre portion being of less thickness than said side portions,

means securing said side portions respectively to said adjacent structural components with said centre portion over said joint, and

roofing material of the bituminous type secured on top of



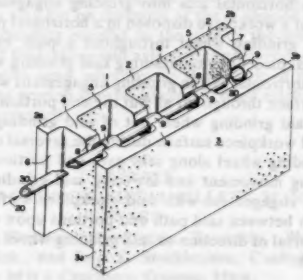
said structural components and being bonded to said synthetic rubber of said side portions.

4,018,018

ARCHITECTURAL BLOCK AND THE STRUCTURE COMPOSED THEREOF

Momotoshi Kosuge, No. 834-9 Kitaishigaki, Beppu, Oita, Japan

Filed Nov. 26, 1974, Ser. No. 527,367
Claims priority, application Japan, Dec. 17, 1973, 48-141605
Int. Cl.² E02D *35/00*
U.S. Cl. 52—127 10 Claims



6. A structural member including a plurality of architectural blocks, said member comprising:

a. a plurality of blocks aligned in at least one row, each block including two opposed side walls, at least two parallel partitions between said side walls and perpendicular thereto, said partitions and side walls defining chambers within said block and groove means, formed in one edge of each of said partitions, wherein the groove means in each row of said blocks are aligned with each other, said groove means having a removable hollow pipe means therethrough for carrying a foamable synthetic resin composition into said chambers from the exterior of said block during the construction of said wall;

b. cover plate means extending between the outside ends of the first blocks at the end of each said row; and

c. a foamable synthetic resin composition within said chambers, said composition comprising a lightweight heat insulator and moisture proof material.

4,018,019

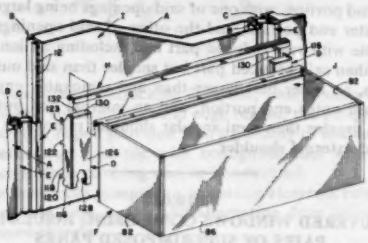
PANEL AND STRUCTURAL UNITS FOR WALL ASSEMBLIES

Richard L. Raith, Solon, and Joseph A. Davenport, Middleburg Heights, both of Ohio, assignors to Hauserman, Inc., Cleveland, Ohio

Division of Ser. No. 498,418, Aug. 19, 1974, Pat. No. 3,886,698, which is a continuation of Ser. No. 370,477, June 15, 1973, abandoned. This application May 27, 1975, Ser. No. 581,115

Int. Cl.² A47B 5/02; A47G 19/02

U.S. Cl. 52—239 **18 Claims**



1. A sheet metal face for a rectangular panel, said sheet metal face having at least one edge portion bent and folded to define a recessed double-thickness flange, a plurality of longitudinally spaced slots in said flange, said face having a substantially plane rectangular central portion and opposite side edge portions, both of said side edge portions being bent and folded to have said recessed double-thickness flange thereon, each of said edge portions being bent to define a web portion extending inwardly from said central portion, each of said edge portions being reversely folded to define a main folded portion extending outward from said web portion relative to said central portion, said main folded portion extending back toward said web portion and being bent to define an inwardly extending terminal flange which extends inward relative to said central portion in the same direction as said web portion, and said main folded portions defining said double-thickness flanges.

4,018,020

MODULAR WALL CONSTRUCTION

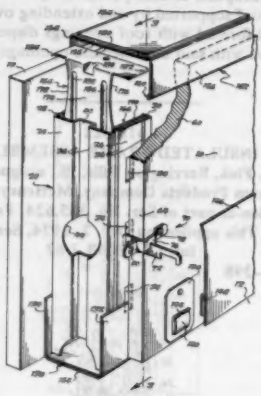
Gale E. Sauer, Williamsville, and Barton G. Hansen, Cheektowaga, both of N.Y., assignors to Roblin Industries, Inc., Buffalo, N.Y.

Division of Ser. No. 411,703, Nov. 1, 1973, Pat. No. 3,925,948. This application Apr. 16, 1975, Ser. No. 568,397

Int. Cl.² E04B 2/28

U.S. Cl. 52—241 **5 Claims**

1. A stud extender clip in combination with a stud having a channel shaped opening and a right angularly related member having a channel shaped opening, said stud extender clip comprising an elongated body having a web and a pair of opposite flanges extending in a direction normal to the plane of said web, an extension formed integral with said web and extending axially therefrom past said flanges, a flat head extending in a direction normal to said extension and formed integral therewith, said head projecting laterally past the lateral edges of said extension and terminating in end portions inclined toward said body wherein said body and said head of said clip are received in said channel shaped openings of said stud and said right angularly related member respectively so that a clearance is provided between said right angularly related member and the opposite lateral edges of said extension whereby the reception of a structural panel therein is facilitated.



4,018,021

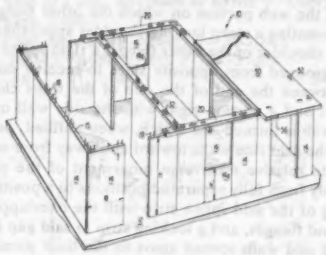
BUILDING AND METHOD OF MAKING SAME

Jimmy Dow, 9 Alley 5, Lane 12, Jen-Ai Road, Sec. 4, Taipei, China /Taiwan

Filed Sept. 13, 1974, Ser. No. 505,701

Int. Cl.² E04B 1/04

U.S. Cl. 52—251 **10 Claims**



1. A building of a type having exterior and interior walls formed of precast vertical panels of a selected width juxtaposed in a manner to provide the outline of the building and its interior partitioning, wherein some of said panels are spaced a panel width from its nearest panel to provide door openings, wherein a number of panels have less vertical height than others to provide window openings and wherein the remainder of said panels are of the same height such that their upper surfaces fall in the same horizontal plane, the improvement comprising,

a plurality of linking bars of substantially rectangular configuration having lengths in multiples equal to the widths of said panels and positioned over said panels so that their respective ends are positioned at the mid-width points of said panels,

said bars having linking slots at their ends formed by relatively narrow slots leading to enlarged sectors and wherein the adjacent narrow slots form a narrow passageway communicating the enlarged sectors thereof to form a chamber,

a reinforcing member having a narrow midportion and enlarged ends for reception as a unit in said chamber,

reinforcing bars embedded in said wall panels and having portions extending upwardly beyond the upper surface of said panel,

said linking bars having openings intermediate their lengths for the reception of said portions,

a precast roof supported by and extending over said linking bars and formed with roof openings disposed in vertical alignment with said intermediate openings of said linking bars.

4,018,022

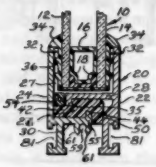
INSULATED FRAME ASSEMBLY

Frederick M. Fink, Barrington Hills, Ill., assignor to Continental Aluminum Products Company, McHenry, Ill.

Continuation-in-part of Ser. No. 335,624, Feb. 26, 1973, abandoned. This application Dec. 2, 1974, Ser. No. 528,677

Int. Cl.² E06B *3/62*

U.S. Cl. 52—398 **5 Claims**



1. A frame strip assembly comprising laterally spaced side walls forming a channel between parallel edge zones thereof to receive a member to be framed, and interlocking means positioned to leave said channel free and including webs extending inwardly relative to the side walls, said webs including closely spaced overlapped portions, narrow flanges on the ends of the overlapped web portions, each flange projecting toward the web portion on which the other flange is formed and presenting a steep locking shoulder approximately opposing the shoulder of the other flange, a rigid spline strip in said space grooved from opposite sides to receive said flanges, a gap between the end of the one of the webs closest to said channel and a portion rigid with the side wall on which the other web is formed and which, when unfilled, permits pivoting of the said side walls toward and away from each other to facilitate relative transverse movement of the parts into an assembly from fully separated positions to a position for interlocking of the said spline strip with the overlapped web portions and flanges, and a locking strip in said gap dimensioned to hold said walls spread apart to the limit permitted by the spline strip and of sufficient compressive strength to lock said assembly while said channel remains empty.

4,018,023

CERAMIC ELEMENTS AND INSULATION ASSEMBLY INCLUDING SUCH ELEMENTS

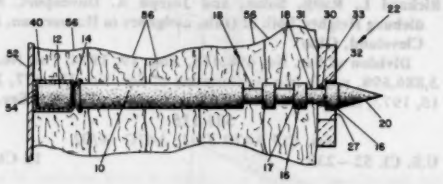
Ralph A. Anderson, Niagara Falls, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.

Continuation of Ser. No. 448,791, March 6, 1974, abandoned. This application July 18, 1975, Ser. No. 597,109

Int. Cl.² E04B *1/62*; F16B *21/04*

U.S. Cl. 52—410 **2 Claims**

1. A high temperature furnace insulation assembly including, in combination with a furnace wall and a body of flexible insulation material, a fastener supporting said body on said furnace wall, wherein the improvement comprises: said fastener including a socket attached at its inner end to said furnace wall; a removable and replaceable, unitary ceramic pin inserted into said socket and over which pin said body is impaled, and a ceramic washer holding said body in place on said pin between said furnace wall and said washer; said pin having an inner end portion provided with an annular groove, and an outer end portion having a reduced part and an external and inwardly facing, annular shoulder; said socket having flexible wall means slid over said inner end portion and provided at the outer end of said socket with interior lip means snap fit into said groove, and a ceramic washer moved on said outer end portion and including an aperture defining two intersecting through openings having intersections separated by spacing larger than said reduced part but smaller than said



outer end portion, with one of said openings being larger than said outer end portion, and the other of said openings being alignable with said reduced part and including an inner part larger than said reduced part but smaller than said outer end portion, an outer part larger than and removably engagable with said outer end portion, and an internal and outwardly facing, greater than semi-annular shoulder removably engaging said external shoulder.

4,018,024

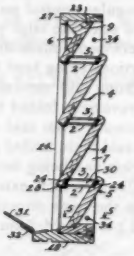
LOUVERED WINDOWS COMPRISING INSULATING PAIRS OF SUPERIMPOSED PANES

William Stelzer, 1354 Blue Heron Drive, Milford, Mich. 48042

Filed Sept. 22, 1975, Ser. No. 615,540

Int. Cl.² E06B *7/08*

U.S. Cl. 52—473 **1 Claim**



1. A window for admitting light to a building, comprising pairs of horizontally level superposed transparent panes sealingly held in spaced relationship to contain a layer of still air to serve as a heat and cold insulator, each of said pairs consisting of an upper pane and a lower pane, said panes being disposed at right angle to the force of gravity to prevent heat convection in said still air, structural means to support said pairs of transparent panes, said structural means and said transparent panes composing a sash as a self-contained unit, and a window frame, said sash being adapted to fit into said window frame to be easily removed from said window frame and selectively reinserted into said window frame in a reversed position so that for use in cold weather said upper pane in a pair of panes is exposed to the inside of said building and said lower pane is exposed to the outside of said building, and that for use in hot weather said upper pane is exposed to the outside of said building and said lower pane to the inside of said building, said structural means comprising cross-members extending longitudinally parallel with said panes to form louvers, each of said cross-members having an outside edge and an inside edge, each of said pairs of panes being disposed between said outside edge of one of said cross-members and said inside edge of the next one of said cross-members, said

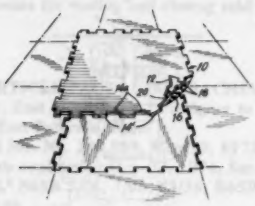
pairs of panes being sealingly supported by said cross-members.

4,018,025

VENTILATED INTERLOCKING FLOOR TILE

Roderick E. Collette, Pawling, N.Y., assignor to Pawling Rubber Corporation, Pawling, N.Y.

Filed Nov. 28, 1975, Ser. No. 635,958
Int. Cl.² E04C 1/30, 2/30
U.S. Cl. 52—590 5 Claims



1. A ventilated, interlocking floor tile, which comprises
a. a heavy, substantially solid edge region, the periphery of said edge region provided with a plurality of interlocks to interconnect said tile with contiguous tiles whereby a floor surface covering can be constructed,
b. said interlocks comprising projecting elements extending from said edge region and alternating dove tailed slots formed thereby,
c. said projecting elements interlocking with the adjacently positioned dove tail slots of a contiguous tile,
d. said tile including an inner region integral with said heavy, substantially solid edge region,
e. said heavy edge region defining a cavity on the back side of said tile beneath said inner region, whereby said heavy, substantially solid edge region provides added support to the tile at the junction area between contiguous tiles and said tile contains an open air space beneath said inner region,
f. said cavity including a plurality of knob-like projections extending from the back side of said tile at said inner region to floor level to support said tile, while providing an air space within said cavity, and
g. said heavy edge region including ventilating grooves extending from the cavity to the tile edges to accommodate the flow of air to and from said cavity.

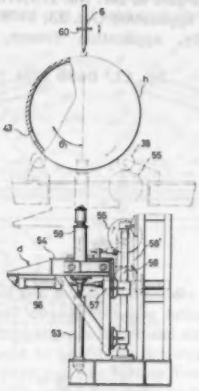
4,018,026

AUTOMATIC CONTINUOUS BARREL FILLING METHOD

Makoto Kamisaka; Kanji Kojima; Tatsuya Negoro; Toshichika Uchikubo; Yusho Okamoto, Honishi, and Sadao Minato, all of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Division of Ser. No. 469,852, May 14, 1974, Pat. No. 3,977,154. This application Dec. 15, 1975, Ser. No. 640,760
Int. Cl.² B65B 1/04, 43/60
U.S. Cl. 53—37 7 Claims

1. An automatic, continuous barrel-filling method comprising the steps of supplying empty barrels, having bungholes, to dollies for movement of the empty barrels radially towards the periphery of an intermittently rotated turntable; while each empty barrel is supported on a dolly during such radial movement, centering the bunghole axially relative to the dolly; moving the dolly radially to transfer the empty barrel, with its thus axially-centered bunghole, to a carrier on the periphery of the turntable; retracting the dolly from the turntable; engaging a filling nozzle with the barrel in circumferential alignment with the bunghole; rotating the barrel on the carrier at a relatively high speed to detect when the bunghole faces vertically downward; responsive to such detection, halting the high speed rotation with the bunghole less than 180° past its downwardly facing position; rotating the barrel on the carrier at a relatively low speed until the filling nozzle engages into the bunghole when the bunghole faces vertically upward; responsive thereto, immediately halting the low speed rotation of the barrel; then initiating filling of the barrel through the filling



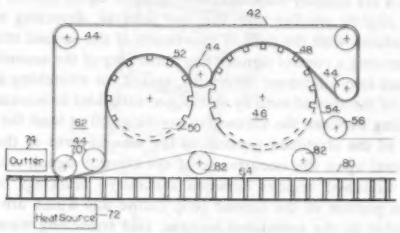
nozzle inserted into the barrel through the bunghole; interrupting the filling of the barrel when the liquid level reaches a predetermined height in the barrel; retracting the filling nozzle from the filled barrel; bunging the bunghole of the filled barrel; and then removing the filled barrel from the carrier.

4,018,027

HEAT INSTALLED MULTI-PACK CARRIER MACHINE

Byron V. Curry, Santa Barbara, and Teofil L. Bonkowski, Stockton, both of Calif., assignors to Byron V. Curry et al., Santa Barbara, Calif.

Filed June 2, 1975, Ser. No. 583,183
Int. Cl.² B65B 21/00, 21/24, 27/04
U.S. Cl. 53—48 8 Claims



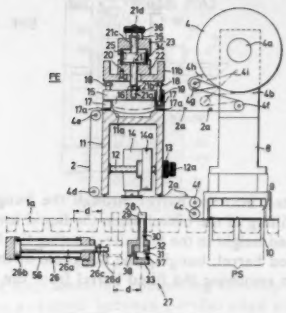
1. A machine for packaging an array of elements with a shrinkable sheet material in which the shrinkable sheet material is formed as a sheet having a multiplicity of openings, one for each element intended to be interconnected as a package, the machine including:
means to pre-form said shrinkable sheet material about said openings into a shape closely approximating but larger than the shape said material will assume on interconnecting said elements,
means for applying said shrinkable, pre-formed sheet material about an array of said elements,
means for shrinking said material by application of an external force after the material is applied about the array of elements to interconnect the elements into a package, and
means for directing a sheet of said material in sequence to said pre-forming means then to said applying means.

4,018,028

ARRANGEMENT FOR ALIGNING HEAT-SEALABLE LIDS ON MATING PRODUCT-FILLED CONTAINERS

Henry Donnet, Falaise, France, assignor to Societe d'Application Plastique Mecanique et Electronique, Plastimecanique S.A., Courbevoie, France

Continuation-in-part of Ser. No. 273,273, July 19, 1972, abandoned. This application Oct. 23, 1975, Ser. No. 625,325
Claims priority, application France, July 23, 1971, 71.27006
Int. Cl.² B65B 9/04
U.S. Cl. 53—51 3 Claims



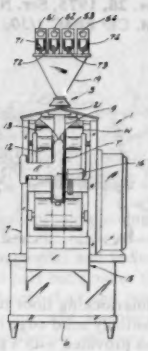
1. In an apparatus for producing a succession of identical heat-sealed containers, comprising means for indexing into a heat-sealing station a plurality of troughs preformed on a first strip through equal first intervals and for simultaneously indexing a second strip into the station, the troughs being disposed at equal distances corresponding to the first interval, the second strip having disposed thereon detectable markings which are initially disposed therealong at equal second intervals slightly smaller than the first interval, detecting means associated with the path of movement of the second strip for generating a control signal when a marking of the second strip comes into alignment therewith, means for stretching a portion of the second strip by an amount sufficient to increase the spacing between the successive markings on at least the front end of the stretched portion of the second strip to the first interval upon the occurrence of the control signal, whereby the stretched regions between successive markings on the front portion of the second strip define lids which are heat-sealable to the associated troughs, said stretching means including preforming means disposed upstream of the station and responsive to the control signal for initiating an elongation of an intermediate portion of the second strip, corresponding in length to the difference between the first and second intervals, between successive indexing movements, the improvement wherein the preforming means comprises, in combination, first and second clamping means disposed in spaced relation for gripping and immobilizing the ends of the intermediate section of the second strip in response to the control signal, each of the first and second clamping means being disposed upstream of the detecting means, and means independent of the first and second clamping means for imparting a longitudinal deformation to the so-gripped intermediate section of the second strip; and wherein the apparatus further comprises means for positioning the detecting means relative to the second strip for initiating the generation of the control signal at the end of each indexing movement.

4,018,029

PACKAGING APPARATUS

Richard W. Safranski, and Lloyd Kovacs, both of Sheboygan, Wis., assignors to Hayssen Manufacturing Co., Sheboygan, Wis.

Filed Oct. 7, 1975, Ser. No. 620,329
Int. Cl.² B65B 1/32, 61/26
U.S. Cl. 53—59 W 20 Claims



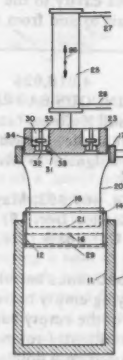
1. Packaging apparatus comprising a plurality of means each adapted to measure out a batch of a product for delivery to a package, means for delivering the batch measured out by any one of the measuring means to a package, and means operable in accordance with the delivery of each batch to a package for marking on that package a code designating the particular measuring means which measured out that batch.

4,018,030

ARRANGEMENT FOR VACUUM PACKING OF FOODSTUFFS AND THE LIKE

Od Wikar Christensson, Stockholm-Bromma, Sweden, assignor to Christenssons Maskiner & Patenter AB, Stockholm-Bromma, Sweden

Division of Ser. No. 340,197, March 12, 1973. This application May 6, 1975, Ser. No. 575,076
Int. Cl.² B65B 1/24
U.S. Cl. 53—124 B 7 Claims



1. An arrangement for compressing a product to be packed in a package before evacuation and closing of said package which comprises a piston, means for lowering the piston into the package to act on substantially the entire-free upper surface of the product in said package so as to compress the product in the interior of the package unidirectionally to such an extent that the product to be packed will assume at least approximately the volume which the product would assume in

said package if no mechanical compression had existed but the only compression had been the one subjected to the package after closing in an evacuation chamber and thereafter being brought out into the ambient atmosphere, said means for lowering the piston including guide means for the piston movable in such a way that the piston will be directed during its downward movement into the mouth of the package, a frame for carrying up said guide means, said frame being provided to lower the guide means into the mouth of the package before the piston has been lowered, means for subjecting said package after said compression to evacuation to further reduce the internal pressure of the product to be packed and means for sealing and closing said package.

4,018,031

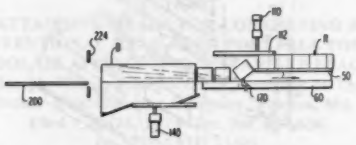
ARTICLE PACKAGING MACHINE

Jesse B. Smaw, East Paterson, N.J., assignor to Marcal Paper Mills, Inc., East Paterson, N.J.

Division of Ser. No. 254,989, May 19, 1972, Pat. No. 3,877,562. This application Dec. 23, 1974, Ser. No. 535,789

Int. Cl.² B65B *5/06, 7/06, 43/36;* **B65H** *1/14*

U.S. Cl. 53—159 **18 Claims**



1. An article packaging assembly comprising: receptacle supporting means; article transfer means reciprocable forwardly and rearwardly and having a substantially horizontal supporting surface for underlying and supporting a quantity of articles; conveyor means for delivering articles onto a rear end of said supporting surface and continuously urging said articles in the forward direction of reciprocation of said article transfer means, so that said supporting surface continuously carries a plurality of continuously forwardly urged articles; means for sensing arrival of an article at a forward end of said supporting surface and for actuating said reciprocating means in response thereto; a second substantially horizontal surface spaced at a lower elevation than the first-mentioned surface, means for advancing a plurality of articles substantially horizontally along said supporting surface to establish a horizontal row of articles aligned substantially horizontally on said supporting surface above said second surface; means for reciprocating the article transfer means relative to said second surface: rearwardly from underlying support of a selected plurality of said articles to displace the selected plurality of articles to the lower level of the second surface while maintaining others of said articles in supported relation on said supporting surface; and thereafter to forwardly engage and push all of the displaced selected articles into a receptacle carried by the receptacle supporting means, and stop means for resisting forward movement of said other articles as they are continuously urged forwardly by said conveyor means, while said supporting surface pushes said selected articles into the receptacle.

4,018,032

CONVEYOR MECHANISM

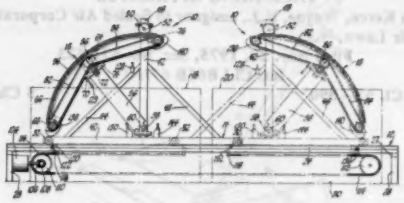
John E. Dempsey, Miamisburg, and Russell F. Meinke, Germantown, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 24, 1976, Ser. No. 689,584

Int. Cl.² B65B *5/10*

U.S. Cl. 53—247 **3 Claims**

1. A conveyor mechanism supported by a base for alternately depositing articles into a pair of spaced containers each of which has a bottom floor, said conveyor mechanism including an elongated frame, a plurality of rollers on said frame supporting an endless belt for moving said articles towards one end or the other end of said frame, an arm having its upper end secured to said frame, a carriage supporting the lower end of said arm, said carriage being supported by said base for horizontal movement between a first position wherein said arm is located adjacent one of said containers and a second



position wherein said arm is located adjacent the other of said containers, the lower end of said arm being pivotally connected to said carriage about a horizontal axis for permitting one end of said frame to be moved downwardly about said horizontal axis to a point near the bottom floor in the adjacent container and gradually raised upwardly as the adjacent container is filled when the carriage is located in said first position and in said second position.

4,018,033

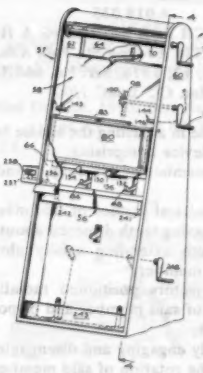
DAYLIGHT FILM HANDLING SYSTEM

Gunter Schmidt, Malibu, Calif., assignor to Cubic Productron Inc., Chula Vista, Calif.

Division of Ser. No. 401,441, Sept. 27, 1973, Pat. No. 3,934,735, which is a division of Ser. No. 52,848, July 7, 1970, Pat. No. 3,790,160. This application Oct. 9, 1975, Ser. No. 621,008

Int. Cl.² B43M *7/02*

U.S. Cl. 53—381 R **2 Claims**



1. An apparatus useful together with a film package comprised of a stack of film sheets contained within an envelope having a first end thereof extending beyond one edge of said stack for removing said stack without exposing said film sheets to light, said apparatus comprising:

light tight housing means adapted to accommodate said film package therein in a substantially vertical orientation with the part of said envelope extending beyond said stack disposed uppermost;

a rotatable bar disposed in said housing means;

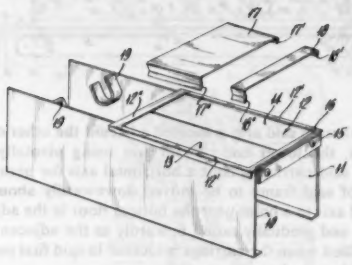
means carried by said bar for engaging said first end of said envelope extending beyond said stack;
means disposed outside of said housing for rotating said bar to lift said envelope from said stack; and
cutting means supported on said housing means for cutting a second end of said envelope remote from said first end.

4,018,034

PACKAGING APPARATUS

Eitan Keren, Wayne, N.J., assignor to Sealed Air Corporation, Fair Lawn, N.J.

Filed Nov. 20, 1975, Ser. No. 633,823
Int. Cl.² B65B *67/10*
U.S. Cl. 53—390 5 Claims



1. Packaging apparatus for articles comprising a frame including means for supporting a roll of self-sealing packaging material in strip form, a table carried by said frame, said table being concave to receive an article or articles to be packaged, cutting means disposed along the outer edge of said table and means transversely bridging said concave table and spaced from said cutting means whereby articles to be packaged are placed on said packaging material overlying said table and centered by said concavity and said material upon being folded over upon itself and at least partially overlying said bridging member and sealed about the edges to complete the packaging is severed from said strip by said cutting means.

4,018,035

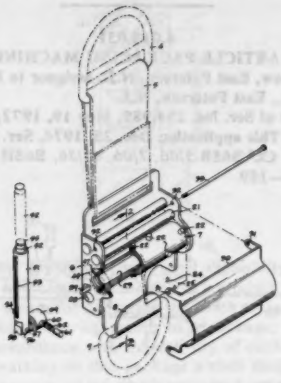
CINCH WINCH FOR SADDLING A HORSE

Neolan V. Morrison, 326 Addison St., Palo Alto, Calif. 94301

Filed Mar. 12, 1976, Ser. No. 666,159
Int. Cl.² B68C *1/00*
U.S. Cl. 54—23 7 Claims

1. In a device for use in adjusting the saddle belt on a horse, an improved winch device comprising:
a hollow rotating member of generally cylindrical configuration,
the internal cylindrical surface of said member comprising a ratchet having teeth disposed about its circumference; said teeth extending axially along the entire length of said member;
a plurality of projectors positioned radially around the exterior surface of said member and disposed to engage holes in said belt;
means for positively engaging and disengaging said projectors to control the rotation of said member;
a sliding shaft positioned concentrically inside said rotating member in axially slidable relation therewith;
a pawl positioned at one end of said shaft in hinged relation therewith and disposed for engagement with said ratchet;
means for limiting the travel of said shaft in an axial direction in said rotating member;
a housing and means for positioning said rotating member within said housing;
means for engaging one end of said housing with one end of an underbelly strap on said horse;
means for engaging the opposite end of said housing with said saddle belt;
handle means for rotating said shaft while said shaft is slid axially within said rotating member;
whereby said saddle belt may be adjusted regardless of the axial position of said pawl in said rotating member.

5. A cylindrical ratcheting device for producing intermittent motion to a follower member comprising:
a stationary housing;
a hollow rotating member of generally cylindrical configuration positioned in said housing;
a plurality of teeth comprising a ratchet positioned around the inside circumference of said rotating member, said



teeth extending axially along the entire length of said member;
a sliding shaft positioned concentrically inside said rotating member in axially slidable relation therewith;
a pawl positioned at one end of said shaft in hinged relation therewith and disposed for engagement with said ratchet;
means for limiting the travel of said shaft in an axial direction in said rotating member;
handle means in cooperative relation with said shaft;
means positioned on said rotating member for engaging said follower member.

4,018,036

METHOD FOR HARVESTING CROPS USING A TRACTOR-PULLED CROP HARVESTER

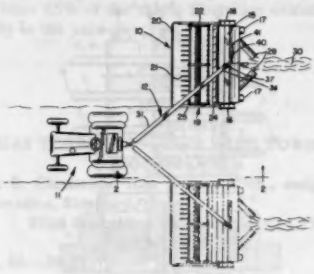
George B. Cicci, Broadview, Ill., Guy O. Tufts, Phoenix, Ariz., assignor to International Harvester Company, Chicago, Ill.

Continuation of Ser. No. 492,632, July 29, 1974, which is a division of Ser. No. 353,037, April 20, 1973, Pat. No. 3,868,811. This application May 20, 1976, Ser. No. 688,204
Int. Cl.² A01D *43/10*
U.S. Cl. 56—1 3 Claims

1. A method of harvesting adjacent rows of standing crops in a field using a wheeled crop harvester having forwardly mounted harvesting apparatus and rearwardly mounted windrowing apparatus and pulled by a tractor, said harvester being adapted to operate on either side of said tractor, comprising:
positioning the harvester with the harvesting apparatus outboard of one side of said tractor, said standing crops being located on said one side;
pulling said harvester with said tractor through a first row of said crops to one end of said field, said harvester operating to harvest and windrow said crops and said tractor being outboard of said standing crops;
turning said tractor and said harvester in the opposite direction of travel at the end of said field;
positioning said harvester on the opposite side of said trac-

tor from said one side while said harvester and said tractor are moving; and

pulling said harvester through a row of standing crops adjacent to said first row to an end of said field opposite said one end, said harvester operating to harvest and windrow said crops in said adjacent row and said tractor riding in said first row and being outboard of said adjacent row.

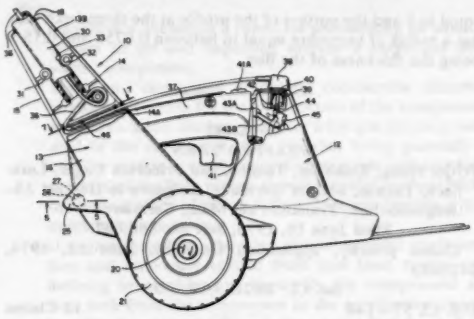


4,018,037

ATTACHING MEANS FOR CONVERTING A CONVENTIONAL HAND-HELD PORTABLE POWER TOOL OR APPLIANCE FOR STAND-UP USAGE

Edwin Joseph Weber, Baltimore, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed Aug. 25, 1975, Ser. No. 607,636
Int. Cl.² A01D 35/00
U.S. Cl. 56—16.7 9 Claims



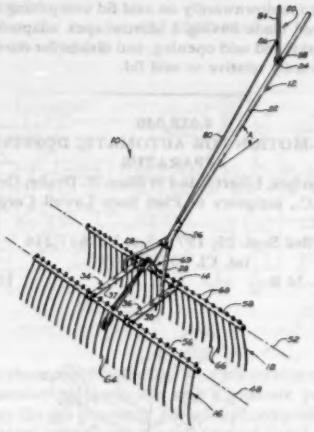
1. In attaching means for converting a conventional hand-held portable-power tool or appliance to provide a device for convenient stand-up usage, wherein the attaching means for retaining the tool has an upwardly-extending wand means, and wherein a top handle provided with switch means is secured to the wand means, and electrical cable means is connected to the switch means and extends downwardly therefrom, the improvement in electrical connection means between the switch means and the tool, which comprises plug means formed on the end of the electrical cable means, receptacle means formed on the tool housing for receiving the plug, a pair of spaced electrical contacts in the receptacle means for engaging the plug means, a second pair of electrical contacts in the tool housing, one of which is stationary and the other of which is movable and is normally engaged by a switch operating member on the tool, means connecting the pair of contacts in the receptacle means in parallel with the respective pair of switch contacts, thereby bypassing the tool switch and facilitating manual control of the stand-up device by the switch means on the top handle, and resilient means in the attaching means for taking up the slack on the end of the electrical cable means and maintaining it substantially taut.

4,018,038

HAND RAKE WITH GRASPING TINES

Charles B. Sipe, 4121 Glencairn Lane, Indianapolis, Ind. 46226

Filed Jan. 5, 1976, Ser. No. 646,858
Int. Cl.² A01D 7/10
U.S. Cl. 56—400.12 10 Claims



1. A hand rake with grasping tines comprising,

a pair of multitined fork members,

frame means for pivotally holding both of said fork members for rocking movement about a pair of separated pivot axes,

handle means secured to said frame means for carrying said fork members, and

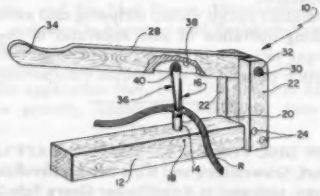
mechanism means for cooperatively varying the pivotal dispositions of both of said fork members with respect to said frame means from an open material raking condition to a closed material transporting condition.

4,018,039

DEVICE FOR SPLICING ROPE

Ralph S. Leeper, 177 Steamboat Ave., North Kingstown, R.I. 02852

Filed Oct. 20, 1975, Ser. No. 624,178
Int. Cl.² B65H 69/06
U.S. Cl. 57—23 12 Claims



1. A device for splicing rope having a hard terminal end formed as by melt cutting comprising, a hollow conical fid having an open slot along one face thereof, means for mounting said fid in position to impale and pierce a running length of said rope so as to form an opening therethrough, means for forcing said rope downwardly on said fid toward said base thereof to progressively expand said opening, said fid temporarily maintaining said opening in said expanded condition so as to permit the hard end of said rope to be positioned adjacent said opening for subsequent passage therethrough, said slot decreasing in width at least along that extent thereof

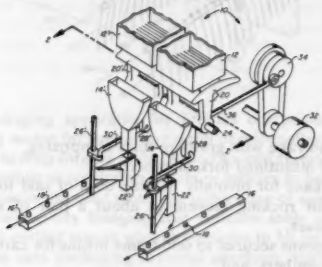
adapted to temporarily receive said running length of rope from the base to the apex thereof and said slot further adapted to receive said hard rope end and to temporarily wedge said end against relative movement therein by reason of its decreasing width configuration when said running length of rope proximate said opening is upwardly withdrawn from said fid, whereby said hard end automatically threads through said opening as the rope is upwardly withdrawn, said means for forcing said rope downwardly on said fid comprising a downwardly tapered blade having a narrow apex adapted for receipt in said slot and said opening, and means for moving said blade downwardly relative to said fid.

4,018,040

STOP-MOTION FOR AUTOMATIC DOFFING APPARATUS

Clinton C. Zerfoss, Liberty, and William H. Drake, Greenville, both of S.C., assignors to Platt Saco Lowell Corporation, Easley, S.C.

Filed Sept. 26, 1975, Ser. No. 617,216
Int. Cl.² D01H 9/18
U.S. Cl. 57—34 R **10 Claims**



1. In an automatic doffing apparatus for a textile spinning machine, said apparatus including bobbin supply means, bobbin conveyor means, and bobbin transporting means for transporting bobbins from said supply means and to said conveyor means, said bobbin transporting means being oscillatorily movable between bobbin receiving and bobbin discharging positions substantially continuously during normal operation of said apparatus, the improvement comprising:

switch means including a switch element mounted adjacent the path of oscillatory movement of said bobbin transporting means foı regular periodic actuation by said bobbin transporting means during normal operation of said apparatus;

and stop-motion circuit means including said switch means for halting operation of said apparatus in response to significant variation in the regular periodic actuation of said switch element by said bobbin transporting means.

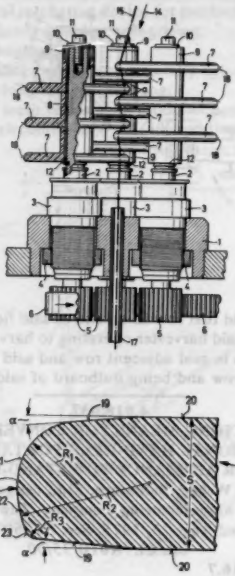
4,018,041

FRICTION DISC FOR FALSE TWISTING APPARATUS

Hans Weigert, Schweinfurt, and Kirit Patel, Elfershausen, both of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Apr. 13, 1976, Ser. No. 676,412
Claims priority, application Germany, Apr. 25, 1975, 2518538
Int. Cl.² D02G 1/08
U.S. Cl. 57—77.4 **4 Claims**

1. In a friction disc for friction false twisting of threads, said disc having a thread-engaging surface having a high co-efficient of friction and a convexly curved asymmetrical profile which is divided into three portions, each forming an arc of a circle of different radius of curvature, the portion at the thread entry face extending over an arcuate length of about 90° up to the apex of the profile and having a radius of curvature equal to between 0.4S and 0.5S, while the intermediate portion of the profile has a radius of curvature substantially



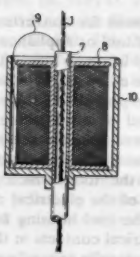
equal to S and the portion of the profile at the thread exit face has a radius of curvature equal to between 0.075S and 0.1S S being the thickness of the disc.

4,018,042

WRAPPED YARN

Fritjof Maag, Kelkheim, Taunus, and Friedrich Unger, Lorsbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 10, 1975, Ser. No. 585,607
Claims priority, application Germany, June 12, 1974, 2428483
Int. Cl.² D02G 3/02, 3/38
U.S. Cl. 57—144 **12 Claims**



1. Yarn consisting of an untwisted staple sliver and at least one filamentary yarn wrapped around this staple sliver, characterized in that:

a. the denier of the filamentary wrapping yarn is less than 15 dtex

b. the elongation at break of the filamentary wrapping yarn is greater than the elongation at break of the staple fibers,

c. the stress/strain relationship of the filamentary wrapping

yarn is such that a force of at least 10 grams is required to produce an elongation of 4%,

d. the shrinkage of the filamentary wrapping yarn is within the same range as the shrinkage of the staple fibers, and,

e. at least 85% of the staple fibers are oriented longitudinally in the yarn direction.

4,018,043

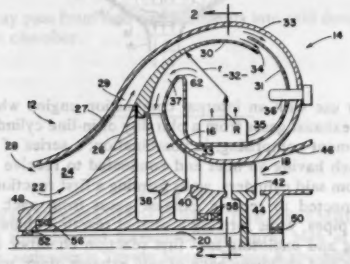
GAS TURBINE ENGINES WITH TOROIDAL COMBUSTORS

William B. Clemmens, Ann Arbor, Mich., assignor to Avco Corporation, Stratford, Conn.

Filed Sept. 19, 1975, Ser. No. 614,754

Int. Cl.² F02C 9/08

U.S. Cl. 60—39.27 **10 Claims**



1. A gas turbine engine comprising, in series flow relationship,

a compressor, including a rotor, for pressurizing an annular stream of air and imparting thereto a tangential flow vector component,

a combustor comprising a toroidal combustion chamber having inlet means for the introduction of the compressed air therein and a discharge exit for a hot gas stream generated in the combustor, said chamber being generally a circular section rotated about the rotor axis, said combustor comprising liner means also of toroidal configuration, the inner surface of which defines the outer bounds of the combustion chamber,

said engine including a housing also of toroidal configuration and outwardly spaced from said liner means and defining in combination therewith the compressed air flow path from the compressor to the combustion chamber, the housing and liner means extending from their upstream ends at the compressor discharge, to downstream end portions leading to the combustion chamber inlet means, said inlet means comprising a primary annular inlet for at least the major portion of the pressurized air, said primary inlet guiding the pressurized air tangentially of the minor axis of the toroidal combustion chamber, whereby the compressed air creates an annular vortex within said combustion chamber,

said combustor further comprising means for introducing fuel into said vortex and maintaining combustion thereof in an endless combustion path to thereby generate the high energy hot gas stream,

said housing extending through at least 360° relative to said minor toroid axis with the outer surface of the downstream end thereof being spaced inwardly from the inner surface of said combustor liner means, to define an annular combustion chamber discharge exit tangentially of the minor axis of the chamber, through which the hot gas stream passes with a substantial tangential component derived from the compressor, and

a turbine having a rotor driven by the hot gas stream discharged from the combustion chamber exit and coupled to the compressor rotor to drive the latter.

4,018,044

ELECTRONIC FUEL CONTROL FOR A GAS TURBINE ENGINE

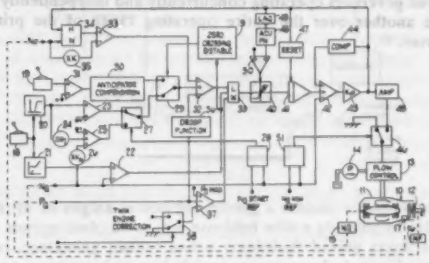
Michael John Joby, Solihull, and Paul Manwaring Maker, Loughton, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed July 7, 1975, Ser. No. 593,388

Claims priority, application United Kingdom, July 9, 1974, 30314/74

Int. Cl.² F02C 9/04

U.S. Cl. 60—39.16 R **5 Claims**



1. An electronic fuel control for a gas turbine engine having a gas turbine gas generator and a separate power turbine driven by the gas generator, the control comprising means for generating a gas generator speed demand signal, a first difference amplifier for comparing said gas generator speed demand signal with a gas generator actual speed signal to produce a gas generator speed error signal, means for generating a power turbine speed demand signal, a second difference amplifier for comparing the power turbine speed demand signal with a power turbine actual speed signal to produce a power turbine speed error signal, an error signal selection circuit connected to said difference amplifiers and arranged to pass foward the lower of said error signals, an acceleration control connected to limit the magnitude of the selected error signal, an integrator for integrating the selected error signal, an output difference amplifier for comparing the output of the integrator with the gas generator actual speed signal to produce a fuel error signal and a fuel flow control device sensitive to said fuel error signal to vary the flow of fuel to the engine.

4,018,045

REGULATING DEVICE FOR A PRIME MOVER, MORE PARTICULARLY FOR A SINGLE-SPOOL GAS TURBINE

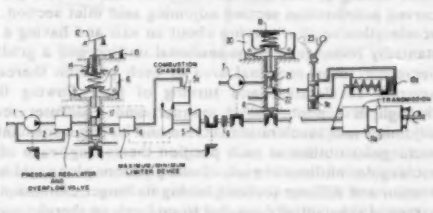
Christian Greune, Furstenfeldbruck; Bruno Herrmann, Lambertheim, and Siegfried Steuer, Unterhaching, all of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Germany

Continuation of Ser. No. 265,478, June 23, 1972, abandoned. This application Nov. 14, 1974, Ser. No. 523,801

Claims priority, application Germany, June 25, 1971, 2331524

Int. Cl.² F02C 9/08

U.S. Cl. 60—39.28 R **11 Claims**



1. System for regulating a prime mover for propelling a

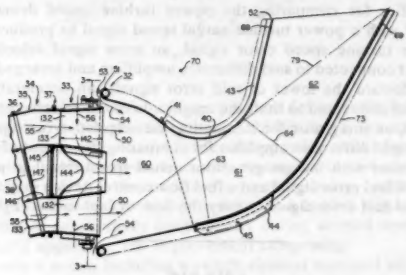
vehicle in which the prime mover includes means providing fuel therefore and means providing a speed signal indicative of the speed of the prime mover, the regulating system comprising a first governor operatively connected with said speed means and directly responsive to the speed signal thereof for continuously controlling the flow of fuel to regulate the power input of the prime mover independently of other operating parameters of the prime mover over at least a predetermined range of the other operating parameters of the prime mover, and a second governor operatively connected with said speed means and directly responsive to the speed signal thereof for regulating the load of the prime mover, said first and second speed governors operating concurrently and independently of one another over the entire operating range of the prime mover.

4,018,046

INFRARED RADIATION SUPPRESSOR FOR GAS TURBINE ENGINE

John F. Hurley, Huntington, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed July 17, 1975, Ser. No. 596,593
Int. Cl.² F02C 7/18, 7/24
U.S. Cl. 60—264 **29 Claims**



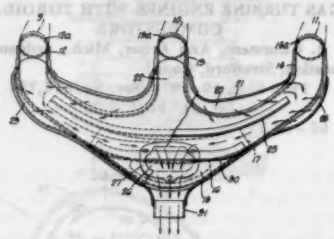
1. An apparatus for suppressing infrared radiation emitted from hot metal parts at the aft end of a gas turbine engine and from the exhaust gas plume thereof during engine operation comprising of dogleg duct and means supporting said duct adjacent said engine to receive its exhaust gases, said duct comprising, an inlet mixing section having a circular inlet arranged concentrically around said aft end with an annular space therebetween and having a substantially rectangular outlet, said annular space being adapted to receive cooling ambient air therethrough by ejector action during engine operation, said circular inlet and rectangular outlet having a smooth transition portion therebetween which provides efficient mixing of said ambient air with said exhaust gases, a curved acceleration section adjoining said inlet section, said acceleration section curving about an axis and having a substantially rectangular cross-sectional outline and a gradually decreasing cross-sectional area at each position therealong assuring acceleration and turning of fluid flowing therethrough in a nonturbulent manner, and a diffuser section adjoining said acceleration section and having a substantially rectangular outline at each position therealong, each of said rectangular outlines at each of said positions along said acceleration and diffuser sections having its longer dimension side arranged substantially parallel to said axis to thereby provide visual blockage of said hot metal parts.

4,018,047

EXHAUST REACTION APPARATUS FOR INTERNAL COMBUSTION ENGINE HAVING IN-LINE CYLINDERS

Kenji Kimura, Wako, and Takao Kajiware, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1975, Ser. No. 635,929
Claims priority, application Japan, Dec. 3, 1974, 49-137719
Int. Cl.² F01N 3/10
U.S. Cl. 60—282 **3 Claims**



1. For use with an internal combustion engine which discharges exhaust gases from a plurality of in-line cylinders, the improvement comprising, in combination: a series of exhaust pipes each having an inlet end connected to receive exhaust gases from said cylinders, walls forming a first reaction chamber connected to receive exhaust gases from each of said exhaust pipes, walls forming a second reaction chamber surrounding and enclosing said first reaction chamber and surrounding and enclosing each of said exhaust pipes, means for discharging exhaust gases from the first reaction chamber into the second reaction chamber, and a deflector secured to the outside of the walls forming said first reaction chamber and secured to the inside of the walls forming the second reaction chamber, said deflector extending continuously from a position adjacent the inlet end of the exhaust pipe at one end of the series to a position adjacent the inlet end of another exhaust pipe at the other end of said series, said deflector extending along the exhaust pipes at both ends of said series, said deflector acting to cause exhaust gases in said second reaction chamber to divide and flow left and right and to pass over the major portion of the length of each of the exhaust pipes.

4,018,048

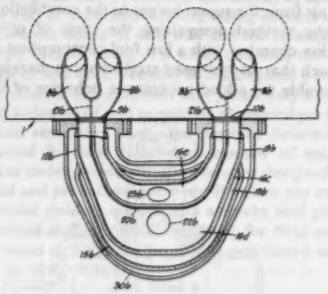
EXHAUST REACTION CHAMBER ASSEMBLY FOR INTERNAL COMBUSTION ENGINE

Saburo Matsuoka, and Kenji Kimura, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1975, Ser. No. 639,204
Claims priority, application Japan, Dec. 18, 1974, 49-144548
Int. Cl.² F01N 3/10
U.S. Cl. 60—282 **6 Claims**

1. In an exhaust reaction chamber assembly for use with an internal combustion engine having a plurality of exhaust ports of different exhaust timing, the improvement comprising, in combination: walls forming an upstream reaction chamber, exhaust branches each having an intake end for connection to one of said exhaust ports, respectively, and each communicating with said upstream reaction chamber, a downstream reaction chamber enclosing and surrounding said upstream reaction chamber and enclosing and surrounding a major portion of the length of each of said exhaust branches, a metal partition of high thermal conductivity dividing said upstream reaction chamber and at least one of said exhaust branches into two compartments sealed from each other, so that exhaust gas

discharges occur alternately to said upstream chamber on opposite sides of said partition, and openings whereby exhaust



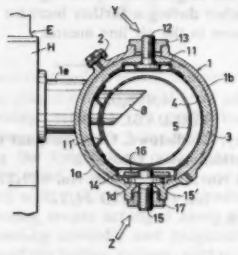
gases may pass from said compartments into said downstream reaction chamber.

4,018,049

EXHAUST MANIFOLD REACTOR ASSEMBLY

Masami Konishi, and Kazumasa Futamura, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Dec. 12, 1975, Ser. No. 640,185
Claims priority, application Japan, July 22, 1975, 50-88872
Int. Cl.[2] F01N 3/10
U.S. Cl. 60—282 9 Claims



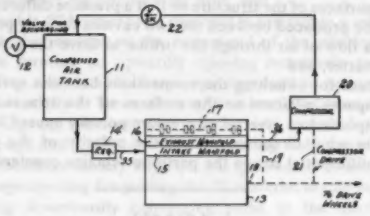
1. An exhaust manifold reactor assembly for an internal combustion engine comprising a reactor casing having a generally hollow longitudinal cylindrical configuration, inlet means communicating said casing with an exhaust port of said internal combustion engine, outlet means communicating said casing with the exhaust pipe of said internal combustion engine exhaust system, a core having a generally cylindrical configuration inserted in said reactor casing generally concentrically therewith, insulating material between said casing and said core, first mounting means fixedly connecting said core to said casing in at least one location, and second mounting means connecting said core to said casing in another location, said second mounting means being configured to enable relative sliding movement between said core and said casing in directions longitudinally of said casing, said second mounting means between said reactor casing and said core comprising a bolt and a nut, said bolt being formed with two flange portions, a support member including a portion defining through said support member a slot through which said bolt extends, said portion of said support member defining said slot being interposed between said two flange portions of said bolt.

4,018,050

COMPRESSED AIR-OPERATED MOTOR EMPLOYING DUAL LOBE CAMS

John R. Murphy, Smithville, Miss., assignor to Coy F. Glenn, Sulligent, Ala., a part interest

Filed July 16, 1976, Ser. No. 705,940
Int. Cl.[2] F15B 11/06
U.S. Cl. 60—370 10 Claims



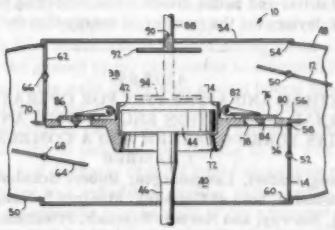
1. In an engine system for driving a vehicle, a compressed air storage tank, an engine provided with a plurality of cylinders containing pistons and a crankshaft having crank elements connected to said pistons, compressed air supply conduit means connecting said storage tank to the cylinders and including respective intake valves controlling admission of compressed air to the cylinders for generating power strokes, exhaust conduit means connected to the cylinders and including respective exhaust valves controlling discharge of expanded air from the cylinders, camshaft means drivingly coupled with the crankshaft, said camshaft means including a plurality of dual-lobed cams, and respective follower means engaging said cams and being operatively coupled to said intake and exhaust valves, said cams and follower means being arranged to open the intake valves shortly after the pistons pass their extended dead center positions in the cylinders to generate the power strokes, and to open the exhaust valves shortly before the pistons reach their retracted dead center positions in the cylinders at the ends of said power strokes.

4,018,051

OMNIDIRECTIONAL AIR DRIVEN POWER GENERATING SYSTEM

David Gay, c/o Mr. W. S. Lewis, 80, Church Lane, Sale, Cheshire M33 5QG, England

Continuation-in-part of Ser. No. 583,530, June 4, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,508
Int. Cl.[2] F03D 3/04
U.S. Cl. 60—398 14 Claims



1. An omnidirectional air driven power generating system for emplacement in a structure which, when exposed to wind, causes the formation of higher than ambient atmospheric pressures in a space adjacent to one surface of the structure and lower than ambient atmospheric pressures in a space adjacent to another, generally opposed surface of the structure, the system comprising

a hollow housing having an internal partition mounted therein so as to divide the interior volume of the housing into two separated cavities, the partition having an orifice therethrough whereby air can move from one cavity to the other,

an air driven power converter mounted within and generally filling the orifice in the partition so that air moving through any portion of the orifice drives the converter,

means for connecting a different one of the two separated cavities to a different one of the spaces adjacent to the surfaces of the structure so that a pressure differential can be produced between the two cavities thereby producing a flow of air through the orifice to drive the power converter, and

means for switching the connections between cavities and spaces adjacent to the surfaces of the structure in response to a reversal of pressure polarity caused by a shift in wind direction so that the polarity of the pressure differential across the partition remains constant.

4,018,052

ACCUMULATOR TO STORE AND RELEASE BRAKING ENERGY

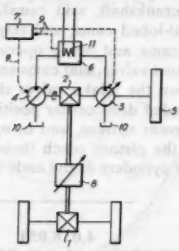
Friedrich Laussermair, Fafnerstrasse 2, 8000 Munich 19, Germany

Filed Oct. 28, 1975, Ser. No. 626,203

Claims priority, application Germany, Oct. 26, 1974, 2451021

Int. Cl.³ F16D *61/00*

U.S. Cl. 60—414 **9 Claims**



1. In a vehicular transmission including a power plant for driving an output shaft through the intermediary of a flywheel, an improvement comprising a gear drive having two degrees of freedom connected to said shaft, said gear drive having a first output; a first device operable selectively as a generator or motor connected to said first output and to said flywheel; a second device selectively operable as a generator or motor; said gear drive having a second output connected to said second drive; and buffer means interconnecting said first and second devices for the transfer of energy therebetween.

4,018,053

METHOD AND APPARATUS FOR OPERATING AN INTERNAL COMBUSTION ENGINE WITH AN EXHAUST GAS TURBO-CHARGER AND A COMBUSTION CHAMBER

Wolfgang Rudert, Langenargen; Robert Schulmeister, Friedrichshafen, both of Germany; Manfred Schlaupitz, Kongsberg, Norway, and Norbert Braetsch, Friedrichshafen, Germany, assignors to Motoren- und Turolnen-union Friedrichshafen GmbH, Germany

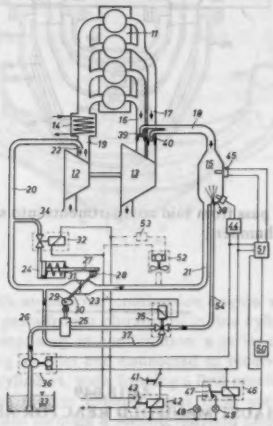
Filed Aug. 1, 1975, Ser. No. 601,331

Claims priority, application Germany, Aug. 8, 1974, 2438162

Int. Cl.³ F02B *33/44*

U.S. Cl. 60—606 **33 Claims**

1. A method for operating an internal combustion engine, the engine includes an exhaust gas turbo-supercharger having an exhaust gas turbine, a combustion chamber means for supplying additional gas to the exhaust gas turbine of the supercharger, and an air line means for supplying supercharged air from the supercharger to the combustion chamber means, the method comprising the steps of operating the combustion chamber with a low fuel consumption at a partial output such that an increased starting supercharging air pressure favorable for a load acceptance behavior of the internal



combustion engine is established in the air line means during an idling of the internal combustion engine increasing the output of the combustion chamber during an acceleration of the internal combustion engine for a rapid increase of the supercharged air pressure in the air line means to obtain a substantially spontaneous load acceptance behavior of the internal combustion engine, and reducing the output of the combustion chamber during a further increase of the supercharged air pressure in the air line means.

4,018,054

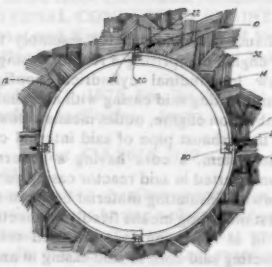
YIELDABLE JOINT

Robert S. Standley, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Nov. 6, 1975, Ser. No. 629,275

Int. Cl.² E21D *11/22*

U.S. Cl. 61—45 R **6 Claims**



1. A yieldable joint between one pair in combination with a plurality of joined pairs of adjacent arcuate plates forming an arcuate structure surrounded by soil such that the adjacent lapped edges of the arcuate plates will shift relative to each other, comprising a pair of arcuate plates to be joined by lapping adjacent edges thereof, at least one pair of corresponding perforations in said lapped plate edges, and a bolt

passing radially through each of said pairs of corresponding perforations, at least one perforation of each pair of corresponding perforations comprising a keyhole elongated in the direction along the line of relative movement of said pair of plates, one end of each said keyhole being of such size as to freely receive the shank of said bolt and the remaining elongated portion thereof being of a width less than the diameter of the shank of said bolt, whereby said elongated perforations will permit relative movement of said plates only upon deformation and widening of said remaining elongated portions, the shape of said remaining elongated portions determining the force required for said relative movement of said plates, whereby said underground structure may be designed to carry a substantial and predetermined overfill before any controlled circumferential yielding occurs, and whereby said plates provide a practical slotted type bolted joint for field assembled structures because they may be readily positioned as desired in relation to each other.

4,018,055

STEEL CAISSONS

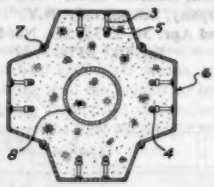
Pierre Alphonse León Marie Ghislain Le Clercq, 22, Avenue des Ormeaux, Brussels, Belgium

Filed Oct. 29, 1974, Ser. No. 518,959

Claims priority, application Belgium, Oct. 26, 1973, 806547; Oct. 18, 1974, 149671

Int. Cl.² E04C 3/32; E04B 1/16; E02D 5/22

U.S. Cl. 61—53 **6 Claims**



1. A prefabricated hollow metal caisson for a building structure and to be placed below ground level and filled with concrete, comprising: at least two prefabricated longitudinal metal wall components each being secured to adjacent components along the longitudinal outer side edges thereof to form a prefabricated hollow caisson, each wall component being provided with a plurality of longitudinally spaced projecting connecting means arranged along each wall component and extending inwardly and perpendicularly from the inner surfaces of the hollow caisson, said projecting connecting means terminating short of the central area of the caisson for providing an open area for admission of concrete into the caisson, and a plurality of longitudinal reinforceing members secured to the inner ends of said projecting connecting means and spaced from the central open area of said caisson.

4,018,056

APPARATUS FOR FORMING CAST-IN-PLACE CASELESS CONCRETE PILES AND THE LIKE

Luis Poma, San Salvador, El Salvador, assignor to Interpile USA, Inc., New Orleans, La.

Filed July 18, 1975, Ser. No. 597,089

Int. Cl.² E02B 5/66

U.S. Cl. 61—53.64 **3 Claims**

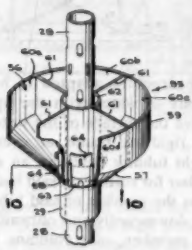
1. Apparatus for use with pile driving equipment for forming in the earth a cast-in-place caseless pile of fill material such as concrete or the like introduced in fluid condition into the vertically elongated pile-forming hole in the earth to set upon curing, comprising

a. a driving tip member adapted to be driven into the ground having a transversely enlarged portion of the cross section and configuration corresponding to that of the desired pile,

b. a vertically elongated driving mandrel for releasably engaging the driving tip member and for transmitting the driving force of the pile driving equipment to the driving tip member, the mandrel being smaller transversely than the diameter of said transversely enlarged portion and having a cross-sectional configuration that affords a large void area for gravity flow of the fill material downwardly throughout the pile-forming hole, and

c. movable fill hopper to be disposed in surrounding relation with the mandrel at the upper end of the pile-forming hole forming an upwardly opening receptacle portion having a bottom discharge opening sized to correspond substantially to the maximum cross-sectional area of the driving tip member and receive said mandrel therethrough and having downwardly sloping walls converging to locations closely adjacent the perimeter of said discharge opening for guiding the fill material in said hopper along downwardly converging paths to the discharge opening,

d. said fill hopper further including a rigid thin-wall tubular sealing skirt joined to and extending downwardly from

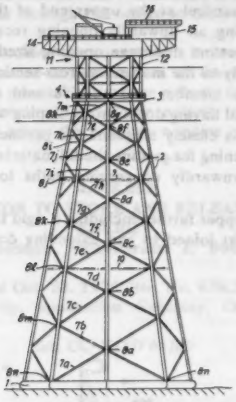


said walls adjacent the perimeter of the discharge opening in concentric relation to a vertical center axis through said discharge opening and mandrel and having a configuration corresponding to and slightly smaller than the transversely enlarged portion of the driving tip member to telescopically advance to the depth of the skirt under the weight of the hopper into the upper portion of the pile-forming hole as the hole is formed during initial penetration of the ground by the tip member to substantially form a seal with the walls of the hole against lateral flow of fill material along the ground surface, said fill hopper including a plurality of radial substantially planiform partitions lying in vertical radial planes relative to the axis of the mandrel and discharge opening joined along their radially inner edges to a cylindrical annular wall member joined to said downwardly sloping walls at the perimeter of said discharge opening to define a pluraity of substantially like capacity subdivision compartments of said receptacle portion each adapted to receive a predetermined quantity of flowable fill material therein, and fill material discharge control means provided for each of said compartments movable between closed and open positions for permitting the pile-forming hole being formed by the driving mandrel and tip member.

4,018,057
OFF SHORE STRUCTURES

Cevdet Erzen, The Hague, Netherlands; Robert Tillyer, Maidstone, and Norman Elliott Williams, Billingham, both of England, assignors to King-Wilkinson, Limited, London, England

Filed May 28, 1974, Ser. No. 473,930
Claims priority, application United Kingdom, June 1, 1973, 26347/73
Int. Cl.² E02B 17/00; F02D 23/02
U.S. Cl. 61—88 8 Claims



1. A tower structure adapted to be supported on a bed beneath a body of water with the upper end of the tower structure above the surface of the water, said tower structure comprising a rigid top frame, an even number greater than four of straight tubular columns, an annular polygonal base support member for resting on said bed having the same number of sides as the number of said tubular columns, said columns sloping downwardly and outwardly from said top frame to said base member, said columns being secured at their lower ends to respective apexes of said base member and at their upper ends to said top frame and having a length predetermined to extend adjacent or above the surface of the water, and an even number of similar sets of coplanar tubular bracing members respectively interconnecting each pair of adjacent columns, the bracing members of each set being arranged in a zig-zag pattern without intersecting each other but with adjacent ends of adjacent bracing members of each set secured to the respective column of the pair at the same anchor point, with the axes of said bracing members substantially intersecting the axis of said respective column at each said anchor point, not more than two bracing members of each set meeting a column at any anchor point, one such bracing member being inclined above the horizontal and the other below the horizontal, the anchor points on each column for the two sets of bracing members connected to the column being in register.

4,018,058
METHOD OF RECOVERING NON-FERROUS METAL CONDUCTORS FROM A TELECOMMUNICATION CABLE LAID IN THE EARTH

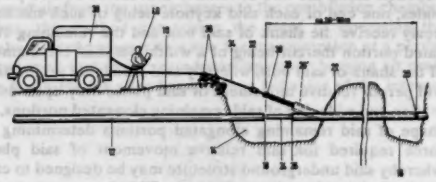
Heinrich Eichenseher, and Wolfgang Eichenseher, both of 721 Rottweil 1, Bohringer-Steige 3/1, Germany

Filed Jan. 14, 1976, Ser. No. 649,163
Claims priority, application Germany, Jan. 17, 1975, 2501656
Int. Cl.² F16L 1/00
U.S. Cl. 61—105 6 Claims

1. A method of recovering non-ferrous metal conductors from a sheathed cable laid in the ground comprising;

a. excavating the earth so as to expose a short length of the cable,

b. cutting through the cable at the excavation and at a location spaced from the excavation, to thereby provide a severed length of the cable,



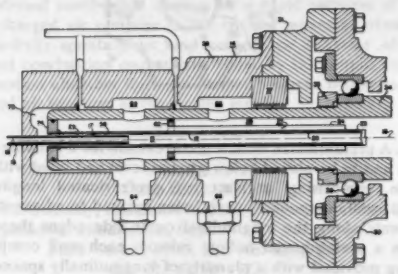
c. stripping the sheath from the end of the severed length of the cable in the excavation to expose the conductors at the end of the severed length, and

d. withdrawing the cable conductor by pulling on the thus stripped end of the conductor of the severed cable.

4,018,059
CRYOGENIC FLUID TRANSFER JOINT EMPLOYING GASEOUS SEALS

Burton D. Hatch, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,170
Int. Cl.² F17C 7/02
U.S. Cl. 62—55 9 Claims



1. In cryogenic apparatus including a rotor wherein the interior portion thereof is bathed in liquefied coolant at cryogenic temperatures, a joint for supplying said liquefied coolant to a conduit within said rotor rotating in unison with said rotor, said joint comprising:

a hollow shaft coupled to said rotor so as to be rotatable therewith, said conduit extending from said rotor into the hollow interior of said shaft;

stationary bayonet means penetrating into the interior of said conduit and delivering said liquefied gas into the interior of said conduit;

an outer wall disposed concentrically about, and spaced apart from, said bayonet means so as to define a relative-motion gap therewith, said outer wall being rigidly coupled to said conduit and rotatable in unison therewith;

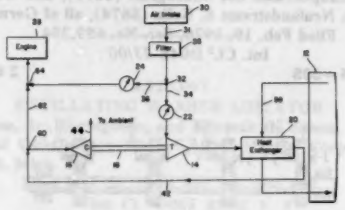
first means gaseously communicating with said relative-motion gap and facilitating flow of gasified coolant from the interior of said conduit completely through said gap in a direction opposite to flow of said liquefied coolant through said bayonet means to help cool said bayonet means; and

second means gaseously communicating with said relative-motion gap to regulate the flow of gasified coolant through said relative-motion gap.

4,018,060
AIR CONDITIONING SYSTEM FOR AIRCRAFT

Robert C. Kinsell, Los Angeles; James C. Noe, Canoga Park, and Carl D. Campbell, Cerritos, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 29, 1975, Ser. No. 609,130
Int. Cl.² F25D 17/06
U.S. Cl. 62—91 17 Claims

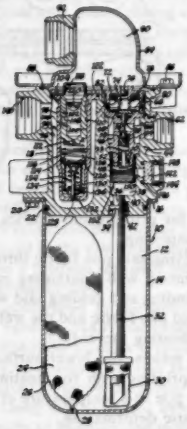


1. In combination:
an enclosure to be cooled;
an engine having an air intake;
a source of air at substantially ambient pressure;
turbine means for receiving air from the source and lowering the temperature and pressure thereof;
heat exchanger means having a first flow path for receiving air from the turbine means to remove heat from the heat exchanger means;
compressor means driven by the turbine means for receiving air from the heat exchanger means, compressing the air and transmitting it to the engine air intake; and
means for circulating fluid from the enclosure through a second flow path of the heat exchanger means for giving up heat to the heat exchanger means.

4,018,061
MOISTURE INDICATOR

Victor A. Williamitis, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 527,610, Nov. 27, 1974, abandoned. This application May 24, 1976, Ser. No. 689,372
Int. Cl.² F25B 49/00
U.S. Cl. 62—125 3 Claims

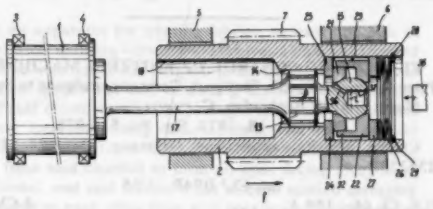


1. A moisture indicator for detecting the relative degree of water mixed with refrigerant in a refrigeration system comprising:
an indicator base made from hygroscopic plastic material mounted within a housing of the refrigerant system in contact with the flow of refrigerant therethrough;
a paint applied to the surface of said indicator base made up of a solution of a hygroscopic plastic and a solvent and with finely divided particles of a cobalt salt therein whereby said paint is characterized by one color when in the absence of significant quantities of water and by a gradual color change to a second color with the presence of increasing quantities of water;
a reference band of colored material on said indicator base adjacent to said painted surface for visual comparison with the color of said painted surface.

4,018,062
DEVICES FOR CONNECTING TWO CO-AXIAL SHAFTS FOR ROTATION AND IN THE AXIAL DIRECTION

Georges Léon Marcel Bulliot, Illzach, France, assignor to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse Cedex, France

Filed June 10, 1975, Ser. No. 585,565
Claims priority, application France, June 27, 1974, 74.22385
Int. Cl.² F16D 3/02
U.S. Cl. 64—7 5 Claims



1. A coupling joining two co-axial shafts for rotation and relative axial movement, comprising a male part integral with one of said shafts, a set of teeth for rotatably driving said male part, a female part on the other of said shafts, a conjugate set of teeth on said female part, said one part being engaged in said other part with a certain amount of radial play which allows the axis of the set of teeth of the male part to pivot slightly with respect to the axis of the set of teeth of the female part, and means for axial interconnection of the two shafts, said means comprising a ball carried by the end of said one shaft adjacent said male part, two cups axially connected to said other shaft, said cups having conjugate surfaces between which said ball is closely held, means mounting said cups so that said cups are slightly displaceable in the radial direction relative to said other shaft, the two sets of teeth having profiles which permit the axes of the two shafts to pivot slightly relative to one another about a point which is at the center of the sets of teeth and which also allows the two shafts to transmit torque under the right conditions.

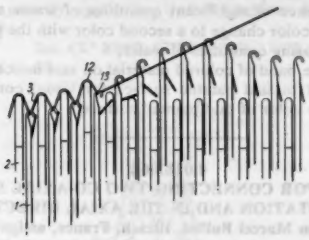
4,018,063
APPARATUS AND METHOD FOR PRODUCING MESHWARE

Alfred Buck, 7401 Hailfingen, Germany

Filed Feb. 24, 1975, Ser. No. 552,263
Claims priority, application Germany, Feb. 25, 1974, 2408924
Int. Cl.² D04B 35/00
U.S. Cl. 66—90 10 Claims

1. An apparatus for producing meshware comprising a needle cylinder, a plurality of needles in said cylinder movable longitudinally therein in a first direction between a first position in which they accept yarn and a second position in which a stitch is formed, a plurality of sinkers positioned between

said needles and movable longitudinally and parallel to said needles and cam means including a first cam surface defining a first smooth curve adapted for smoothly moving said needles between said first and second positions and a second cam surface defining second smooth curve adapted for moving said sinkers in a second direction from a rest position into a loop



forming position and thereafter moving said sinkers in said first direction into a stitch forming position in which a stitch is formed with the said movements of said sinkers in said second and first directions from said rest position through said loop forming position to said stitch forming positon taking place during movement of said needles from said first position to said second position.

4,018,064

ELECTRONIC CONTROL OF KNITTING MACHINES

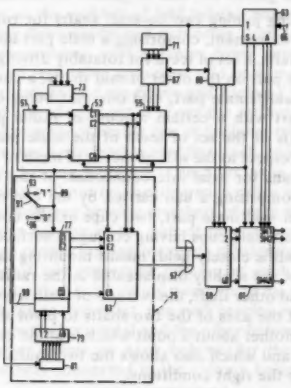
Peter Raymond Doslik, Stuttgart, Germany, assignor to Sulzer Morat GmbH, Bonlanden, Germany

Filed Oct. 18, 1974, Ser. No. 516,078

Claims priority, application Germany, Oct. 24, 1973, 2353252

Int. Cl.² D04B *15/66*

U.S. Cl. 66—154 A **8 Claims**



1. Apparatus for the electronic control of a knitting machine having knitting systems for knitting a fabric, said apparatus comprising: a storage device including an information store, in which the information of a knitting pattern can be stored in block form with every information block containing all the information for one knitted course of said fabric, and including means for producing color lines for deriving color lines from every information block, each color line containing all the information relating to a particular color or property of one of said courses; and further comprising a plurality of storage units, a distributor means for feeding the color lines derived by said color lines produced means to said plurality of storage units, the storage units being positively associated with said knitting systems and said distributor means including a programming means for feeding the color lines derived from each information block to any pre-selected number of the plurality of storage units and for feeding each color line derived from an information block to any pre-selected storage unit of said number of storage units.

4,018,065

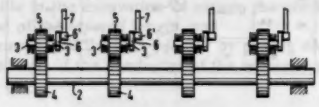
DRIVING APPARATUS FOR THE KNITTING IMPLEMENT BARS OF WARP KNITTING MACHINES

Gunnar Liebrandt, Pitschhausenweg 1a, Naila (8674); Adolf Hägel, Hauptstrasse 68, Bobengrun (8671), and Gerhard Gallwitz, Neulandstrasse 8, Naila (8674), all of Germany

Filed Feb. 19, 1976, Ser. No. 659,354

Int. Cl.² D04B *23/00*

U.S. Cl. 66—208 **2 Claims**



1. Driving apparatus for the knitting implement bars of warp knitting machines, comprising a main shaft, a plurality of individual axles each with a separate bearing arrangement and independent driving connection with said main shaft, each of said axles being provided with at least one eccentric means for generating the desired motions of said bars, and a plurality of linkages each acting on a knitting implement bar and being driven independently from the others by an associated eccentric means.

4,018,066

MACHINE FOR PRINTING PILE FABRICS

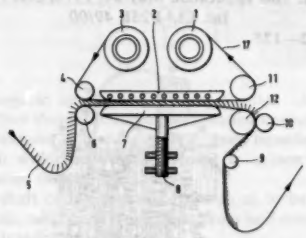
Peter Fennekels, Kempen-Huls, and Herbert Schütze, Grefrath, both of Germany, assignors to Girmes-Werke A.G., Grefrath, Germany

Filed Apr. 26, 1974, Ser. No. 464,464

Claims priority, application Germany, Apr. 28, 1973, 2321592

Int. Cl.² D06P *7/00*; D06B *1/10*

U.S. Cl. 68—5 D **4 Claims**



1. A machine for printing pile fabrics containing thermoplastic fibres, comprising

a. means conveying said pile fabric through a printing zone,

b. a thermoprinting web containing sublimable dyes, and means for winding and guiding said web into contact with the pile of said pile fabric and the web away from said pile fabric after heating thereof,

c. flat heating means, the lower surface of which engages said thermoprinting web for heating the thermoplastic fibres of the pile to a temperature at which they begin to undergo plastic deformation,

d. guide means for supporting said pile fabric, said guide means being positioned below and spaced from said heating means,

e. means for vertically adjusting said guide means toward or

away from said heating means to adjustably compress the pile fabric between said guide means and said heating means to effect sublimation of the dyes into the heating thermoplastic fibres, and

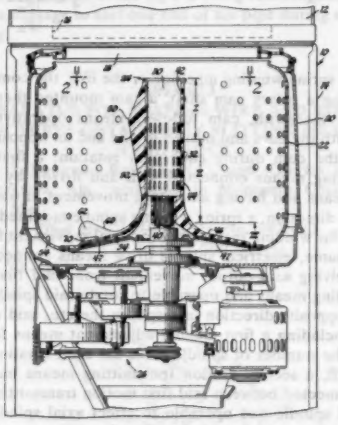
f. an embossing roller positioned beyond the printing area for embossing the printed pile fabric, and means for synchronizing the movement of said thermoprinting web and said embossing roller to permit coordination between the printed color and the embossed pattern on the pile fabric.

4,018,067

OSCILLATING WASHER AGITATOR

Nick Vona, Jr., Springboro, and Kenneth O. Sisson, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 26, 1976, Ser. No. 690,190
Int. Cl.² D06F *13/02*
U.S. Cl. 68—134 **3 Claims**



1. An agitator adapted to effect cleaning of fabrics in a washing machine having a liquid and fabric receiving tub and a drive mechanism adapted to impart to said agitator pivotal oscillation about a vertical axis, said agitator comprising:

a. a center column flaring at the bottom thereof into a skirt having means adapted for mounting the agitator generally vertically in the tub and for connecting the agitator to the drive mechanism, said center column including an upper level portion, a middle level action portion and a lower level action portion,

b. a plurality of generally vertical fins integral with said center column, each of said fins projecting radially from said center column in each of said action portions,

c. each of said fins configured as a flat obtuse triangle in the upper and middle level action portions to pull dry fabrics downwardly into liquid in the tub whie channelizing them loosely suspended in a toroidal turnover between vertical planes formed by adjacent fins,

d. each of said fins configured in the lower level action portion as a radial vane gradually increasing in height in the radially outer direction to form a rounded terminus projecting vertically upwardly from said skirt for imparting energy to the liquid to move the fabric being washed radially outwardly along said skirt and upwardly along a wall of the tub, thereby to maintain the toroidal turnover, the rounded terminus of said vane being flexible with respect to said center column by being rooted to said skirt by a web at the radially outer end thereof which is thinner than said rounded terminus.

4,018,068

APPARATUS HAVING OSCILLATING PERMEABLE WALLS FOR FABRIC TREATMENT

Attilio Bertoldi, Via Luzzago 27, Manerbio (Brescia), Italy

Filed Sept. 3, 1975, Ser. No. 609,922
Claims priority, application Italy, Sept. 12, 1974, 27218/74; June 10, 1975, 24180/75
Int. Cl.² D06B *3/20*
U.S. Cl. 68—175 **8 Claims**

1. In an apparatus for treating fabrics, at least one pair of channel walls defining between themselves a channel adapted to be filled with liquid and adapted to have a fabric which is to be treated spread out and extending through said channel, each of said channel walls comprising a series of sections and shoulders interconnecting said sections, and each of said sections including at least a pair of section walls intersecting distant from said channel to form an apex facing away from said channel, and said section walls of each section diverging with respect to each other from said apex toward said channel to form a substantially V-shaped structure, said sections being spaced from each other along each channel wall and forming pairs of adjoining sections with each pair of adjoining sections respectively having a pair of adjoining section walls which converge toward each other from the apexes of each pair of adjoining sections toward said channel to define between each pair of adjoining sections a liquid passage the section of which decreases from said apexes toward said channel, whereby said channel walls are permeable to liquid capable of travelling through said liquid passages toward said channel, and means connected to said channel walls for transversely oscillating said channel walls in the general direction of said liquid passages to provide a high speed for liquid travelling through said liquid passages toward said channel, and said sections of each channel wall being inclined with respect to said channel for providing from the liquid issuing from between each pair of adjoining sections into said channel a component of movement tending to advance the fabric in the channel in a given direction.

4,018,069

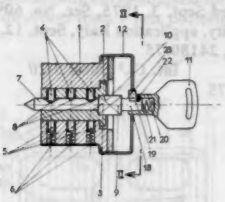
KEY-ACTUATED BARREL-TYPE LOCKS

Paul Lipschutz, Croissy, France, assignor to Neiman, S.A., Courbevoie, France

Filed Mar. 25, 1976, Ser. No. 670,313
Claims priority, application France, May 5, 1975, 75.13894
Int. Cl.² E05B *19/00*
U.S. Cl. 70—395 **6 Claims**

1. In combination, a lock having a body and a rotary barrel and a key comprising a manipulating head and an operating stem for insertion into, and cooperation with, said barrel, means mounting said head to be axially shiftable relative to said stem between a first and a second position, abutment means on said head and means on said lock defining two angularly spaced abutment surfaces cooperating with said

abutment means, said abutment surfaces being axially disposed to be engageable by said abutment means in said first position to permit rotation of said head in said first position



between said surfaces and to preclude rotation beyond said surfaces and, in said second position, to be disengaged from said surfaces to permit rotation of said head beyond at least one of said surfaces.

4,018,070

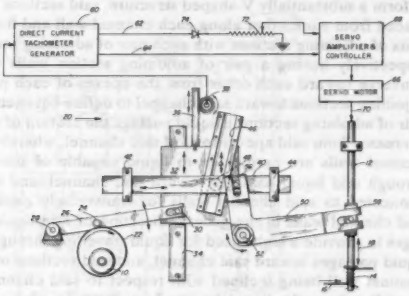
ELECTRO-MECHANICAL DRIVE FOR TORSION WINDERS AND THE LIKE

George Joseph Yagusic, Litchfield, and Bernard Pierre Lampietti, Goshen, both of Conn., assignors to Torin Corporation, Torrington, Conn.

Filed Sept. 30, 1975, Ser. No. 618,169

Int. Cl.² B21F *3/04*

U.S. Cl. 72—19 **21 Claims**



1. The combination in a torsion winder comprising mechanically independent master and slave rotary elements, said elements comprising respectively a cam shaft and a spring winding spindle, signal generator and transducer means connected with said master rotary element and operable to provide an electrical output signal in the form of a variable voltage having a cyclically repetitive waveform with sloped leading and trailing wave edges, and a servo motor and controller connected with and operated by said signal generator and transducer means, said servo motor and controller comprising a precisely regulated high response DC motor and associated power supply and control amplifier, said motor having a response characteristic at least equal to the slope of said leading and trailing wave edges and being capable of high positive and negative accelerations on the order of one thousand RPM per 50 milliseconds, and said servo motor and controller also being connected in driving relationship with said slave rotary element and operable to rotate the latter at an angular velocity variable within approximately 1% of said electrical output signal.

4,018,071

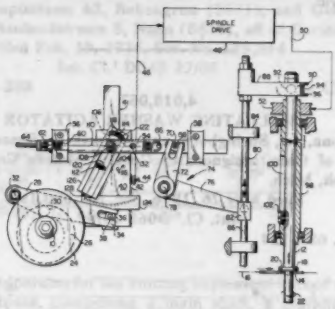
SPRING WINDING MACHINE WITH IMPROVED PITCH MECHANISM

Bernard Pierre Lampietti, Goshen, Conn., assignor to Torin Corporation, Torrington, Conn.

Filed Oct. 9, 1975, Ser. No. 621,209

Int. Cl.² B21F *3/04*

U.S. Cl. 72—23 **25 Claims**



1. In a spring winding machine or the like, the combination comprising a rotary cam shaft, a cam mounted thereon and rotatable therewith, cam follower means operatively associated with the cam and moved in one and an opposite direction by the cam during each cam rotation, a first motion transmitting means connected with and driven by said follower means and having an output movement in one and an opposite direction, a spring winding spindle mounted both for rotation for winding springs and for axial movement for pitching the same, electrical spindle drive means connected with and receiving said output movement from said first motion transmitting means and operable to rotate said spindle in one and an opposite direction in response thereto, said electrical means including a first manual adjustment means for preselecting the number of spindle turns for each rotation of said cam shaft, a second motion transmitting means including a slide connected between said first motion transmitting means and said spindle and operable to effect axial spindle movement in one and an opposite direction in response to said output movement of said first motion transmitting means, and a second manual adjustment means including a guideway mounted on said first motion transmitting means and angularly adjustable about a point on a centerline of movement of said slide and a follower on said slide, said second adjustment means preselecting the extent of spindle axial or pitch movement during each cam rotation and being operable to maintain a constant axial starting position of said spindle irrespective of the extent of axial spindle movement.

4,018,072

END RECORRUGATOR

Paul K. Davis, Alameda, Calif., assignor to Pacific Roller Die Co., Inc., Hayward, Calif.

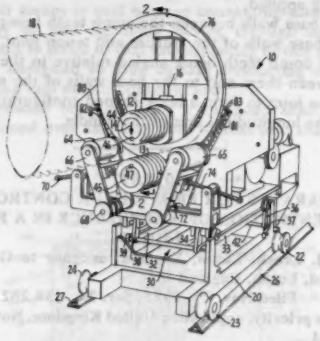
Filed Oct. 22, 1975, Ser. No. 624,675

Int. Cl.² B21D *19/04*

U.S. Cl. 72—106 **13 Claims**

1. In a machine for recorrugating a portion of a helically corrugated pipe which comprises a juxtaposed pair of recorrugating rollers between which one end of the pipe to be recorrugated is inserted and the portion thereof to be recorrugated engaged, a pair of rotatable shafts to which the recorrugating rollers are mounted, and means for driving the rollers to recorrugate said portion of the pipe, the improvement comprising a rotatable annular thrust ring having a marginal portion passing between the shafts so that at least a portion of said one end of the pipe is abutted against said thrust ring, and means for

mounting said thrust ring to prevent axial movement of the ring and thereby prevent axial movement of the pipe as the pipe is recorrugated, said mounting means including means



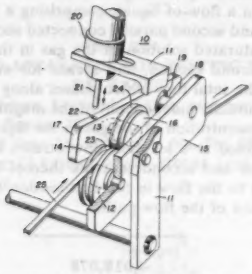
for allowing rotation of the thrust ring corresponding to the rotation of the pipe as the pipe is being recorrugated to minimize the damage to said one end of the pipe during said recorrugating.

4,018,073

APPARATUS FOR SHAPING WIRE AND RIBBON STRUCTURES OBTAINED BY SLITTING METALLIC COIL STOCK

Ronald D. Bartram, Raleigh, N.C., and Charles J. Runkle, Guntersville, Ala., assignors to Monsanto Company, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,412
Int. Cl.² B21B *27/00, 15/00*
U.S. Cl. 72—199 **4 Claims**



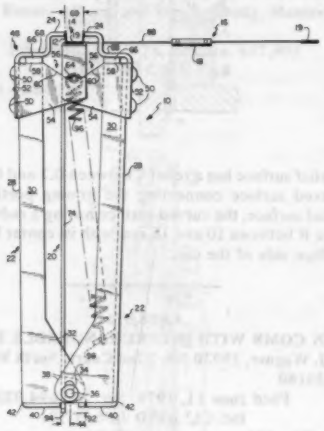
1. In an apparatus for eliminating the burr on a slit metal wire or ribbon product by means of a pair of engaged rolls wherein a first roll has a continuous annular groove having a curved bottom portion and a second roll has a continuous annular land adapted to engage said groove so as to force the burr of said slit product into contact with the curved bottom portion of said groove, the improvement which comprises: a first stationary support member upon which said first roll is rotatably mounted and a second movable support member having said second roll rotatably mounted thereon, said support members being spaced apart a predetermined distance with said first and second rolls being positioned therebetween in an engaging relationship; means for permitting movement of said second support member, said means consisting of a shaft that connects said support members together and a journaled bearing member disposed in said second movable support member, wherein one end of said shaft is fixedly attached to said first stationary support member and the opposing end of said shaft is positioned within said journaled bearing member to permit pivotal movement of said second support member; and means for applying a constant downward force on said second movable support member to control the engagement of said second roll with said first roll.

4,018,074

BELTED AXIAL LEAD ELECTRONIC COMPONENT SPLICING CLIP CRIMPING TOOL

Michael D. Snyder, Chenango Bridge, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.

Filed Mar. 8, 1976, Ser. No. 665,086
Int. Cl.² B21D *7/06*
U.S. Cl. 72—4[illegible] **5 Claims**



1. Apparatus for bending and crimping a splicing clip having a base with linear spacing of opposed upstanding bendable clasps attached to both sides thereof, which interconnects discontinuous belts of axial lead electronic components comprised of:

a pair of rows of opposed movable hammers, said opposed pairs of hammers being spaced apart allowing passage therebetween of said clip,

an anvil surface between said rows of hammers to support said clip, said anvil surface being positioned apart from and substantially paralleling said rows of hammers to receive and position said clip passed between said rows of hammers, each of said hammers being aligned with one of said clasps,

a support holding said anvil surface in a predetermined position relative to said hammers for each position of said movable hammers,

said opposed rows of movable hammers being individually and rigidly attached to a pair of opposed extended handles, said handles being pivotally connected at their ends remote from said hammers, whereby compressing said handles together moves said opposed pairs of hammers closer together translating over said anvil surface until hammer travel terminates with said hammers adjacent said anvil surface.

4,018,075

PLASTIC WORKING DIES FOR CYLINDRICAL PARTS

Hiroyuki Kawawa; Yasushi Ohuchi, and Hisanobu Kanamaru, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

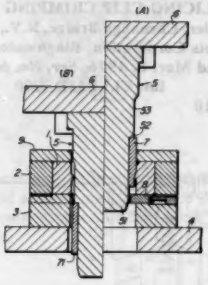
Filed Apr. 30, 1976, Ser. No. 682,044
Claims priority, application Japan, May 12, 1975, 50-54550
Int. Cl.² B21C *3/00*
U.S. Cl. 72—467 **1 Claim**

1. A plastic working die with a hollow portion having an ironing portion thereof, said ironing portion being inwardly

disposed and provided at the front thereof with a die angle portion and at the back thereof with a relief surface, and used for plastic working on cylindrical parts at an ironing rate of less than 50%, characterized in that:

the die angle portion has a die angle θ between 70° and 20°;

the ironing portion has a radius r between 0.7 and 2.0 mm;



the relief surface has a relief S between 0.2 and 0.5 mm; and

a curved surface connecting the ironing portion and the relief surface, the curved surface having a radius of curvature R between 10 and 15 mm with its center being on the hollow side of the die.

4,018,076

FIN COMB WITH INTERCHANGEABLE HEADS

Stuart J. Wagner, 19930 NE. 22nd Court, North Miami Beach, Fla. 33180

Filed June 11, 1976, Ser. No. 694,923

Int. Cl.² B21D *1/06, 37/04*

U.S. Cl. 72—481 **4 Claims**

1. A fin straightening and cleaning comb, comprising:

a. a handle and a plurality of heads interchangeably mountable on said handle,

b. each said head having a plurality of comb teeth formed thereon in spaced relationship,

c. the comb teeth being angled relative to the head to define a generally hook-shaped comb oriented in one direction relative to the handle for a pull-stroke fin straightening or cleaning operation,

d. the head being reversible on the handle to orient the hook-shaped comb in the opposite direction relative to the handle for a push-stroke fin straightening or cleaning operation,

e. the thickness and spacing of the comb teeth on each said head differing from the thickness and spacing of the comb teeth on each of the other heads to complement the thickness and spacing of the fins which are to be straightened or cleaned,

f. each said head and said handle being adapted to be joined by a dovetail-shaped mortise and tenon joint,

g. the base wall of the mortise and the base wall of the tenon being disposed at an angle of approximately 45° to the longitudinal axis of the handle,

h. whereby the heads are disposed at an angle of approximately 135° to said longitudinal axis,

i. said comb teeth having base walls between them which are normally held parallel to the fins to which the comb is being applied,

j. said base walls between the comb teeth being parallel to the base walls of the mortise and tenon joint, and

k. said comb teeth being angled relative to the base walls between them and to the base walls of the mortise and tenon joint to form a hook-shaped configuration relative to the longitudinal axis of the handle.

4,018,077

APPARATUS FOR PROVIDING A CONTROLLED CONCENTRATION OF A SUBSTANCE IN A FLOW OF LIQUID

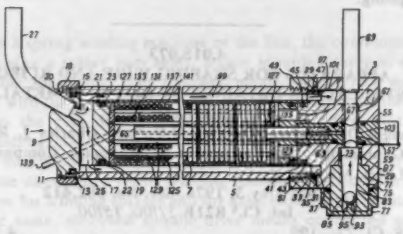
Robert J. Leach, Luton, England, assignor to George Kent Limited, Luton, England

Filed Nov. 21, 1975, Ser. No. 634,282

Claims priority, application United Kingdom, Nov. 22, 1974, 50789/74

Int. Cl.² G01N *27/00*; B01F *1/00*

U.S. Cl. 73—1 R **16 Claims**



1. Apparatus for providing a controlled concentration of a soluble gas in a flow of liquid, comprising a liquid flow path having first and second parallel connected sections, means for forming a saturated solution of the gas in the liquid flowing along the second section, and means for ensuring that the fraction of the total flow which passes along the second section is substantially independent of the magnitude of the total flow, the concentration of the gas in the liquid flow whereby being controlled at a location downstream in the flow path from the first and second sections thereof by virtue of the contribution to the flow in the first section of flow from the second section of the flow path.

4,018,078

CALIBRATION SYSTEM FOR MAGNETIC SWITCHES USED IN WRIST INSTRUMENTS

Terry M. Haber, 3197 Airport Loop Drive B, Costa Mesa, Calif. 92626

Filed Apr. 26, 1976, Ser. No. 680,154

Int. Cl.² G01P *21/00*

U.S. Cl. 73—1 D **4 Claims**

1. An apparatus for calibrating a magnetic switch including a body having an end bore for receiving a magnet in the upper portion thereof wherein said magnet normally holds a conducting member in spaced relationship, along an axis of said body coaxial with said bore, from switch contacts in said body adjacent to its opposite end such that a sudden acceleration and/or deceleration movement of said body in the direction of said axis frees the member from said magnet so that it will move in the direction of said axis and momentarily bridge said switch contacts, said apparatus including, in combination:

a. a housing having an upper vertical opening for receiving and holding said body in a fixed position with its said axis vertically oriented and its end bore and magnet exposed at the top of said housing and with said conducting mem-

ber held in bridging engagement with said switch contacts by gravity;

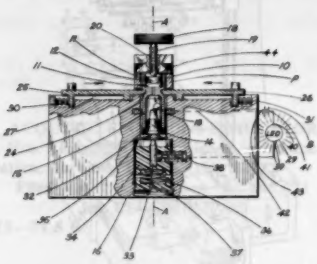
b. a signalling device;

c. a source of electrical energy for said signalling device;

d. circuit means in said housing connecting said source of energy to said signalling device through said switch contacts in series so that said signalling device is continuously energized so long as said conducting member is bridging said switch contacts; and

e. a threaded bore receiving a threaded shaft coaxially positioned over said end bore so that said shaft is positioned to engage the upper end of said magnet and upon rotation, gradually force said magnet downwardly relative to said body and housing along said bore towards said conducting member until a point in travel of said magnet along said bore is reached at which the attraction of said magnet lifts said conducting member from said switch contacts, said point of travel being indicated by de-energization of said signalling device

whereby said magnet is then known to be properly positioned in said body for proper operation of said magnetic switch and can then be secured and sealed in said end bore of said body at said point of travel.

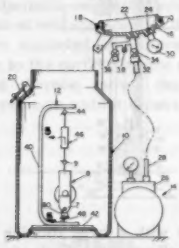


4,018,079

METHOD AND APPARATUS FOR TESTING HYDRAULIC RELEASES

George E. Landrigan, Lynnfield, Mass., assignor to Landrigan Corporation, Boston, Mass.

Filed June 16, 1975, Ser. No. 586,988
Int. Cl.² G01L *27/00*; G01M *3/02*
U.S. Cl. 73—4 R **1 Claim**



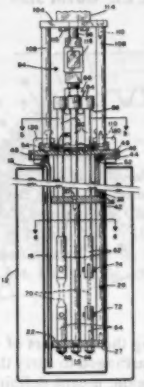
1. A method of testing a marine Hydraulic Release of the type used to secure life rafts and the like to ships comprising placing the Hydraulic Release on a test stand and applying tension to it to approximate service conditions, enclosing the thus tensioned Hydraulic Release in a superatmospheric pressure vessel, applying compressed air to the interior of the closed vessel in a manner to subject the Hydraulic Release directly to air under superatmospheric pressure, gradually increasing superatmospheric air pressure simulating corresponding hydraulic pressure related to submergence of the device below the surface of the sea while monitoring an air pressure gauge sensitive to the superatmospheric pressure within the vessel, detecting the instant of release of the Hydraulic Release in response to the directly contacting superatmospheric air pressure and noting the reading of said air pressure gauge at the time of such release, only those Hydraulic Releases which release in a predetermined superatmospheric air pressure range being accepted.

4,018,080

DEVICE FOR TENSIONING TEST SPECIMENS WITHIN AN HERMETICALLY SEALED CHAMBER

James C. Fletcher, Administrator of the National Aeronautics & Space Administration, with respect to an invention of; Page K. Evans, Athens, and Dan L. Shady, Huntsville, both of Ala.

Filed Feb. 13, 1976, Ser. No. 657,995
Int. Cl.² G01N *3/18*
U.S. Cl. 73—15.6 **1 Claim**



1. In combination with a dewar, a device for tensioning test specimens disposed within a bath of cryogenic fluid confined within a chamber comprising:

A. a support column adapted to be received within said chamber comprising a pair of plates including a bottom plate and a top plate and a plurality of compression members for supporting the plates in a mutually spaced relationship, each plate of said pair being of a disk-shaped configuration and characterized by an array of bores formed therein in coaxial alignment with the bores of the other plate of the pair;

B. a plurality of anchor pins fixed within the array of bores characterizing the bottom plate, each pin of said plurality being adapted to receive a test specimen in an interconnected relationship therewith for thereby securing a plurality of test specimens to said support column;

C. a plurality of axially displaceable pull rods extended into said chamber, each of said plurality being projected through a bore formed in the top plate of said support column and adapted to be connected at one end thereof to a test specimen rigidly secured to said support column, and characterized by a head formed at the opposite end thereof adapted to be received by a female connector;

D. a cover plate seated on said dewar for sealing the chamber and characterized by an array of bores through which sid plurality of pull rods are extended in an hermetically sealed relationship therewith;

E. a spacer of a cylindrical configuration interposed between said cover plate and said support column and connected thereto for securing said support column in place within said chamber;

F. an actuator support releasably mounted on said cover plate comprising a base plate and a top plate interconnected through a plurality of vertically oriented compression members;

G. an actuator including an axially retractable, vertically oriented shaft mounted on said actuator support;

H. a connecting link including a female coupling adapted to receive a head of a pull rod in a coupled relationship therewith; and

I. a load cell connected to said link between said shaft and said pull rod for measuring tensile stress induced in the link.

4,018,081

TESTING OF CIGARETTES

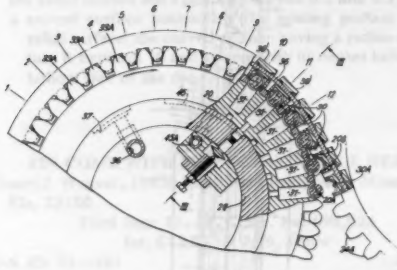
John Loxham, Bletchley, England, assignor to Molins Limited, England

Filed Nov. 10, 1975, Ser. No. 630,403

Claims priority, application United Kingdom, Nov. 12, 1974, 48841/74

Int. Cl.² G01M *3/26*

U.S. Cl. 73—41 **20 Claims**



1. A device for testing the wrappers of cigarettes for leaks, comprising a conveyor arranged to carry the cigarettes successively through a test region, means defining in the test region a plurality of similar test chambers partly bounded by the respective cigarette wrappers, a source of pressure which communicates with each test chamber in turn at a first station in the test region to produce a predetermined initial pressure in each test chamber, and a pressure detector arranged to detect the pressure left in each test chamber in turn at a second station in the test region downstream of the first station.

4,018,082

DEVICE FOR NONDESTRUCTIVE ULTRASONIC TESTING OF CYLINDRICAL PARTS

Victor Manoliu; Andrei Lutescu; Gheorghe Ionescu; Silviu Heretoiu; Victor Frangopol, and Lucuta Petru, all of Bucharest, Romania, assignors to Institutul Pentru Creatie Stintifica si Tehnica-Increst, Bucharest, Romania

Filed Sept. 30, 1975, Ser. No. 618,205

Claims priority, application Romania, Dec. 30, 1974, 80986

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.5 R **5 Claims**

1. A device for the nondestructive testing with ultrasonics of cylindrical parts, comprising:

a turntable provided with a basin adapted to receive a cylindrical part to be tested and provided with a gear;

a pinion meshing with said gear;

drive means for rotating said pinion;

a vertically disposed leadscrew;

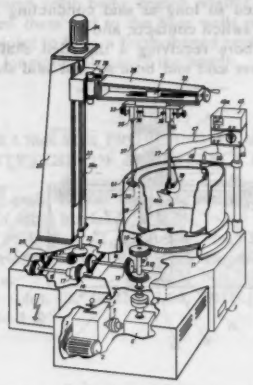
a pair of change gears operatively connecting said leadscrew with said drive means;

a horizontal arm vertically displaced by said leadscrew and overhanging said part;

a pair of piezoelectric transducers carried by said arm for scanning said part;

an arcograph carried by said arm and having a trace element energizable to mark a fault directly on the part scanned by said transducers; and

a fault detector connected to said piezoelectric transducers and operatively connected to said arcograph for energizing said trace element upon detection of a fault by said transducers, said transducers sweeping along the surfaces of said part a generally helical path of a pitch determined by the relative rates of rotation of said turntable and said leadscrew.



4,018,083

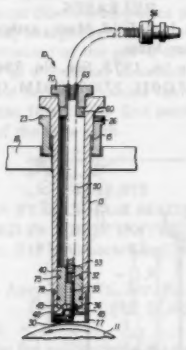
VIBRATION DETECTION PROBE HOLDER

Herbert N. Hoffman, Lunenburg, Mass., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,838

Int. Cl.² G01H *11/00*

U.S. Cl. 73—70 **4 Claims**



1. In combination with a large rotating shaft machine, a probe for measuring vibrations occurring in said rotating shaft and said probe being a non-contact vibration detection probe which is maintained out of contact with the rotating shaft, said combination further comprising:

a probe housing which is supported by said machine having an end portion which is located a first proximate distance from said shaft; said probe housing being disposed substantially radial with respect to said shaft;

a bore formed within said probe housing receiving said probe;

stop means formed within said probe housing for limiting the travel of said probe through said probe housing in the

radial direction toward said shaft, said probe having an end portion which is located a second more proximate distance from said shaft but out of contact therewith, said probe housing permanently locating said probe with respect to said shaft whereby said probe may be removed and replaced into said housing so as to always be identically repositioned with respect to said shaft; and,

a splash shield defined by a cylindrical member depending radially inward from the end portion of said probe holder and concentric about the radially inward end of said probe.

4,018,084

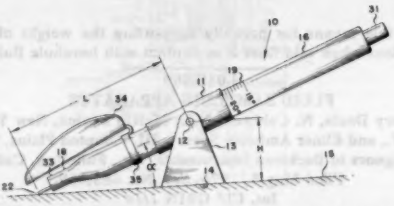
ACOUSTIC EMISSIONS SIMULATOR

Nelson N. Hsu, Lexington, Ky., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed May 13, 1976, Ser. No. 686,071

Int. Cl.² G01N *29/00*

U.S. Cl. 73—71.5 R **7 Claims**



1. An instrument adapted to generate a stress pulse on a localized area of a metal specimen simulating the acoustic emission which emanates from an actual crack in said specimen comprising:

an outer cylindrical tube tapered at its forward end;

a core mounted for limited sliding movement in said tube;

a gripping element carried by said core at its forward end adjacent said tapered tube end and adapted to secure a frangible element when said core moves toward said tapered tube end and to release said frangible element when said core moves toward the aft end of said tube, whereby said frangible element is moved a predetermined distance toward and extended a predetermined distance beyond said tapered tube end; and

an angularly adjustable support carried by said tube for abutment against said specimen to dispose said frangible element when extended as aforesaid at a preselected angle relative to the surface of said specimen whereby a force applied thereon moves the frangible element against said specimen until it breaks.

4,018,085

AMPLIFYING RIBBON EXTENSOMETER

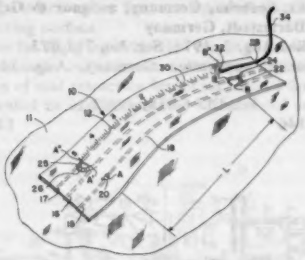
Vernon L. Alley, Jr., Newport News, and Austin D. McHatton, Hampton, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 14, 1975, Ser. No. 632,112

Int. Cl.² G01B *5/30*

U.S. Cl. 73—88 R **12 Claims**

1. A strain gauge comprising: an elongated inextensible member associated with a test object; said inextensible member traversing said test object in differing directions along a strain axis of the test object and being moveable relative thereto in response to strain of the test object, thereby providing means to amplify strain experienced by the test object; and means for indicating said amplified strain.



4,018,086

SYSTEM FOR MAINTAINING A DIESEL ENGINE

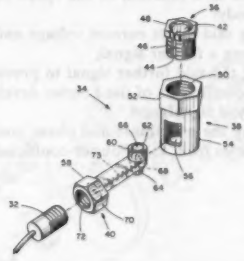
Gary E. Clark, and Art J. Miller, both of Chicago, Ill., assignors to Sun Electric Corporation, Chicago, Ill.

Division of Ser. No. 619,463, Oct. 3, 1975, Pat. No. 3,978,721.

This application Apr. 5, 1976, Ser. No. 673,389

Int. Cl.² G01M *15/00*

U.S. Cl. 73—119 A **4 Claims**



1. Means for coupling a transducer and a diesel engine including a fuel pump and a fuel injection line, said fuel pump having a discharge port, comprising in combination:

a retaining nut adapted to receive said fuel injection line therein;

an adapter having a first and second end, said first end being adapted to securingly receive said discharge port of said fuel pump, said second end being adapted to receive said retaining nut and said fuel injection line, said first end defining an opening, and

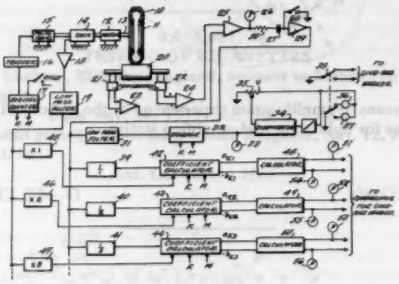
a transducer boss having an external end adapted to receive said transducer and an internal end, said opening being adapted to receive said internal end in an assembled state, said internal end defining a fuel line seat and a discharge port seat for substantially sealing said coupling means to said fuel pump and said fuel injection line in said assembled state, said retaining nut urging said fuel injection line and said discharge port against said fuel line seat and said discharge port seat, respectively, said transducer boss defining a communicating channel between said external and internal ends.

4,018,087

METHOD AND APPARATUS FOR TESTING THE UNIFORMITY OF A ROTARY BODY

Friedrich Wenz, Seeheim, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Aug. 2, 1976, Ser. No. 711,073
Claims priority, application Germany, Aug. 14, 1975, 2536332
Int. Cl.² G01M 17/02
U.S. Cl. 73—146 13 Claims



1. A method of testing the uniformity of a rotary body comprising the steps of:
rotating said body;
producing, by means of transducers coupled to receive vibrations from the rotary body, an electrical analysis signal having an amplitude which varies as a function of the non-uniformities;
producing a direct current voltage signal which varies in amplitude as a function of the speed of rotation of the rotary body;
multiplying said direct current voltage and analysis signals to produce a further signal;
integrating the said further signal to provide the harmonic Fourier coefficients of the Fourier development series of the analysis signal; and
determining the magnitude and phase position of the non-uniformities from said Fourier coefficients.

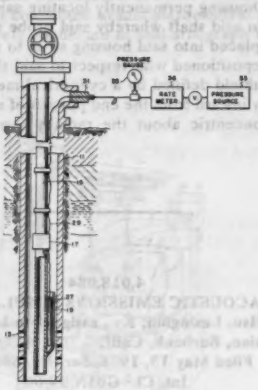
4,018,088

BOREHOLE PRESSURE MEASUREMENT APPARATUS HAVING A HIGH PRESSURE FLOAT VALVE

Billy Walton McArthur, Wallis, Tex., assignor to Sperry-Sun Well Surveying Company, Sugar Land, Tex.

Filed Dec. 8, 1975, Ser. No. 638,392
Int. Cl.² E21B 47/06
U.S. Cl. 73—151 7 Claims

1. Borehole pressure measurement apparatus, comprising:
a pressure source at the surface;
a microtube in fluid communication with the pressure source and extending into the borehole;
a chamber positioned in said borehole in the area where pressure is to be measured and in fluid communication with the microtube on its upper side,
said chamber being open on its lower end to the entry of borehole fluids and having a float positioned in said chamber to close the opening to said microtube when buoyantly supported by the borehole fluids; and



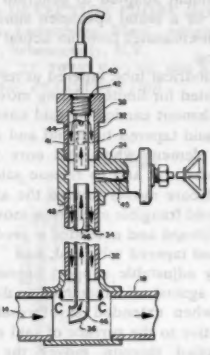
flexible means for partially supporting the weight of the float when said float is in contact with borehole fluid.

4,018,089

FLUID SAMPLING APPARATUS

Gregory Dzula, N. Caldwell, N.J.; Melvin Levine, New York, N.Y., and Elmer Ambrose Sperry, III, Pompton Plains, N.J., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed May 5, 1976, Ser. No. 683,569
Int. Cl.² G01N 1/14
U.S. Cl. 73—422 R 10 Claims



1. Improved insertion type sampling apparatus for sampling a moving fluid in a main conduit comprising:
a. a body adapted to be mounted on the main conduit and having a first opening and a second opening into the interior of the main conduit, said body further having a passageway therein communicating on one end with said first opening and communicating on the other end with said second opening whereby fluid can enter said passageway from said main conduit through one of said openings, flow through said passageway and re-enter the fluid in the main conduit through the other of said openings, the portion of said passageway up to said means for holding a sensor and the portion of said passageway after said means for holding a sensor being a pair of conduits one within the other;
b. first nozzle means connected to said first opening and being disposed with an opening in the moving fluid whereby the kinetic energy of the moving fluid will force a portion of the fluid through said passageway;

c. valve means operably attached to said body and being adapted to open and close said passageway in two locations with one movable actuator; and,

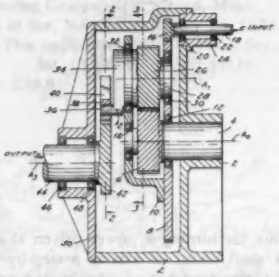
d. means for holding a sensor disposed between said two locations of valve opening and closing in said passageway and being so shaped and positioned that when said valve means is in the open position a portion of the fluid passing through said passageway will contact a sensor held by said holding means.

4,018,090

ROTARY AND LINEAR REVERSIBLE INDEXING MECHANISM

John Henry Brems, 32867 White Oaks Trail, Birmingham, Mich. 48010

Filed May 15, 1975, Ser. No. 577,943
Int. Cl.² F16H *37/12*
U.S. Cl. 74—52 **8 Claims**



1. An intermittent reversible indexing system having a rotary input and a rotary output, with variable kinematic characteristics comprising:

a. a frame,

b. a circular reaction member mounted in said frame and concentric about a first axis,

c. a first rotating member mounted for rotation in said frame and rotating about said first axis,

d. a second rotating member of different diameter than said circular reaction member mounted for rotation on said first rotating member and rotating about a second axis displaced from said first axis and adapted for tangential driving engagement with said circular reaction member,

e. an eccentric member mounted on said second rotating member concentric about a third axis displaced from said second axis,

f. an output member mounted for rotation in said frame and rotating about a fourth axis displaced from said first axis and in driven engagement with said eccentric member, and

g. input power means driving one of said rotating members.

4,018,091

PIVOTABLE EXTRACTOR HOLD DOWN APPARATUS

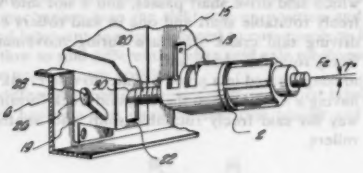
Robert Allen Hollingsead, Yorba Linda, and Clyde Robert Pryor, Anaheim, both of Calif., assignors to Hollingsead-Pryor Enterprises, Inc., Santa Fe Springs, Calif.

Continuation of Ser. No. 360,113, May 14, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 608,565
Int. Cl.² F16H *27/02*
U.S. Cl. 74—89.15 **6 Claims**

1. Apparatus for inserting an electronic unit in and removing it from a supporting structure having a supporting surface by applying forces at one end of said electronic unit, relative to said supporting structure, whereby the electronic unit is inserted and removed along an axis of movement parallel with the supporting surface, said apparatus comprising:

means for applying insertion forces to said one end of said electronic unit, said insertion forces having a force component perpendicular and directed towards said supporting surface and a force component parallel to said supporting surface;

means for applying extraction forces to said one end of said electronic unit, and for controlling the angle of application of said extraction forces such that a force component parallel to said supporting surface and substantially no components in a direction perpendicular to said supporting surface are exerted for the duration of travel of said electronic unit along said axis; and



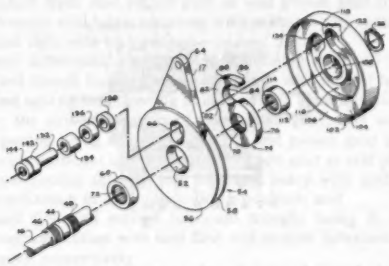
means for locking said extraction force applying means into a position that prevents said electronic unit from being lifted out of contact with said supporting surface despite any extraneous force being applied to said electronic unit during extraction.

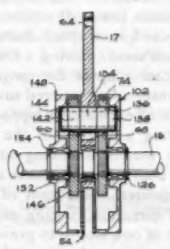
4,018,092

MECHANICAL SEQUENCER

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Walter Thomas Appleberry, Long Beach, Calif.

Filed Feb. 17, 1976, Ser. No. 658,450
Int. Cl.² F16H *21/44*
U.S. Cl. 74—96 **14 Claims**





1. A mechanical sequencing module comprising:

a rotatable drive shaft having a shaft spline formed thereon;

a freely rotatable shaft having a plurality of rollers positioned thereon, the axis of the freely rotatable shaft hav-

ing an axis parallel to and offset from the axis of the drive shaft;

a drive fitting having an opening therein, said drive fitting being positioned on said drive shaft spline for rotating said fitting upon rotation of said drive shaft, and a finger portion for enabling said drive fitting to move said rollers and said freely rotatable shaft;

a crank structure positioned in a plane perpendicular to the axes of said drive shaft and said freely rotatable shaft, said crank structure having a drive shaft opening through which said drive shaft passes, and a slot into which said freely rotatable shaft and one of said rollers extends for driving said crank structure during movement of said freely rotatable shaft; and

a housing formed in a plane parallel to said crank structure, having a track formed therein, said track forming a guideway for said freely rotatable shaft and another of said rollers.

4,018,093

DEVICE FOR TRANSFORMING RECIPROCATING MOTIONS INTO TURNING MOTIONS

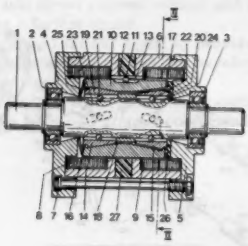
Sven Walter Nilsson, Partille, Sweden, assignor to SKF Nova A.B., Goteborg, Sweden

Filed Sept. 30, 1975, Ser. No. 618,146

Claims priority, application Sweden, Nov. 4, 1974, 7413796

Int. Cl.² F16H *27/02*

U.S. Cl. 74—126 **11 Claims**



1. A device for transforming a reciprocating linear movement into a rotary movement comprising a first member adapted for reciprocating axial movement relative to a turnable second member, means for displacing said reciprocating first member in opposite linear directions, at least a pair of annular sleeves disposed in a space between said first and second members, each sleeve having a frustoconical tapered surface confronting and adapted for torque transmitting engagement with a corresponding tapered surface on one of said members, the surface of each sleeve opposite the frustoconical surface confronting a surface of the other one of said members and guide means including at least one helical groove in one of said confronting surfaces and a guide element engageable in said grooves, actuation of said one member linearly in one axial direction causing engagement with the frustoconical surface of one sleeve to prevent turning relative to said one member and through said guide means rotation of said other member, actuation of said one member linearly in an opposite axial direction causing engagement with the frustoconical surface of said other sleeve and through said guide means rotation of said other member.

4,018,094

APPARATUS FOR INTERMITTENTLY TURNING A TURBINE SHAFT

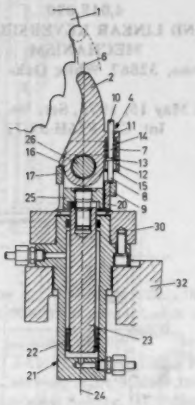
Horst Schmidt, Saalfelden, Austria, assignor to Sulzer Turbomaschinen AG, Zurich, Switzerland

Filed Aug. 27, 1975, Ser. No. 608,289

Claims priority, application Switzerland, Sept. 11, 1974, 12342/74

Int. Cl.² F16H *27/02*

U.S. Cl. 74—128 **8 Claims**



1. Apparatus for turning a power driven shaft such as a turbine rotor shaft about its axis in a step-by-step manner comprising a toothed ratchet wheel mounted on the shaft, a ratchet arm engageable with the teeth on said ratchet wheel, means pivotally mounting said ratchet arm on a support for deflection about an axis parallel to the axis of said ratchet wheel, actuating means for effecting a to and fro rectilinear movement of said ratchet arm support and hence also said ratchet arm from a starting position towards and away from said ratchet wheel, means producing during said to and fro rectilinear movement of said ratchet arm a deflection thereof about its pivot axis towards and away from the toothed periphery of said ratchet wheel, and means carried by said ratchet arm and operable in the event the ratchet wheel is put into rotation by starting up of the turbine while said ratchet arm is engaged with said ratchet wheel for detaining said ratchet arm against a return movement towards said ratchet wheel after being hurled outwardly therefrom to a predetermined position.

4,018,095

DRIVING DEVICE FOR BICYCLE

Keizo Shimano, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Mar. 29, 1976, Ser. No. 671,705

Claims priority, application Japan, June 6, 1975, 50-73488; June 6, 1975, 50-73490; June 6, 1975, 50-73489

Int. Cl. F16h *55/30*

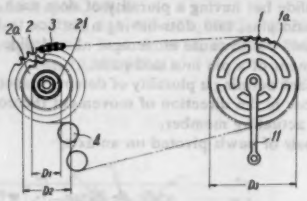
U.S. Cl. 74—217 B **5 Claims**

1. A driving device for a bicycle, which comprises a front gear comprising one or more toothed sprockets mounted to a gear crank,

a rear gear comprising one or more toothed sprockets mounted to a rear hub, and

a driving chain stretched across said front and said rear gears,

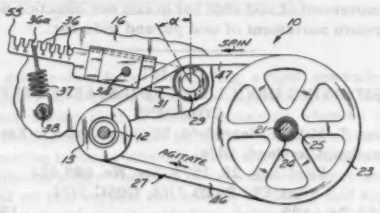
the teeth of te sprockets of the front gear and the rear gear have a pitch in the range of 8.5mm to 11.5mm respectively, and said driving chain having its pitch equal or multiples of said teeth pitch of the sprockets.



4,018,096
SLIPPING BELT CLUTCH

James R. Foster, Webster City, Iowa, assignor to Franklin Manufacturing Company, St. Cloud, Minn.

Division of Ser. No. 599,178, July 25, 1975, Pat. No. 3,965,768. This application Mar. 8, 1976, Ser. No. 664,912
Int. Cl.² F16H 55/42, 55/36
U.S. Cl. 74—230.01 3 Claims



1. A shaft mountable pulley for cooperation with a drive belt, comprising an outer peripheral rim portion including a circumferential V-groove engageable by the V-belt, a hub portion having an axial cylindrical bore for reception therein of a shaft, means on said hub portion for fixing said pulley on a shaft positioned in said bore, a web portion intermediate said rim and hub portions, said rim, intermediate web, and hub portions being integral, said web portion including at least one axially extending cylindrical tubular land portion formed by at least two axial grooves concentric with said bore and each other, each of said grooves extending axially inward from an associated pulley end face towards the opposite pulley end face of the other groove, said grooves being radially relatively close to one another such that said land portion is relatively thin in comparison to the rim and hub portions, said grooves having sufficient axial length relative to the length of the pulley that relatively thin end walls, in comparison to the rim and hub portions, are formed at their respective opposite pulley faces.

4,018,097
AXLE LUBRICATION SYSTEM

Alan R. Ross, Lyndhurst, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 7, 1976, Ser. No. 647,280
Int. Cl.² F16H 57/04, 1/40; F01M 9/00, 1/00
U.S. Cl. 74—467 16 Claims

1. An axle mechanism operable to be mounted in either a right-side-up or an upside-down position and receive a rotating input drive, said axle mechanism comprising:

a. an axle housing;

b. a differential carrier housing adapted to be mounted on said axle housing and defining a differential bearing support;

c. a pinion gear driven by the input drive and carried by said differential carrier housing;

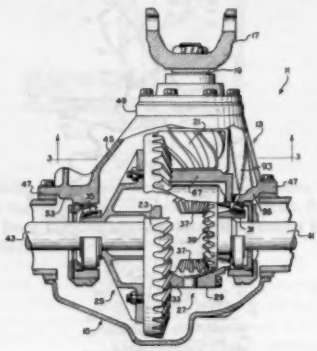
d. a ring gear in meshing engagement with said pinion gear;

e. a differential secured to said ring gear and rotatably disposed adjacent said differential bearing support;

f. a lubricant sump within said differential carrier housing, said lubricant sump having a static level sufficient to submerge at least a portion of said pinion gear;

g. said differential bearing support defining first and second lubricant passages, said first lubricant passage disposed to communicate lubricant flow to said differential when said axle mechanism is in the right-side-up position and said second lubricant passage disposed to communicate lubricant flow to said differential when said axle mechanism is in the upside-down position;

h. said differential carrier housing defining a first lubricant trough having a first opening, said first trough and said first opening being oriented generally parallel to the axis of rotation of said pinion gear, said first opening being disposed adjacent said pinion gear to receive lubricant splash from said pinion gear as said pinion gear rotates through said lubricant sump with said axle mechanism in said right-side-up position;



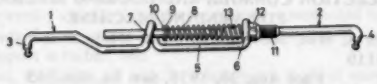
i. said differential carrier housing defining a second lubricant trough having a second opening, said second trough and said second opening being oriented generally parallel to the axis of rotation of said pinion gear, said second opening being disposed adjacent said pinion gear to receive lubricant splash from said pinion gear as said pinion gear rotates through said lubricant sump with said axle mechanism in said upside-down position; and

j. said first and second lubricant troughs being in open communication with said first and second lubricant passages, respectively.

4,018,098
EXHAUST GAS RETURN VALVE ACTUATING ROD

Alfred Beier, Hondelage, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

Filed Mar. 4, 1976, Ser. No. 663,691
Claims priority, application Germany, Apr. 12, 1975, 2516112
Int. Cl.² G05G 1/00; F16B 7/10
U.S. Cl. 74—470 7 Claims



1. An actuating rod for interconnecting a throttle with an exhaust gas return valve, comprising;

a first rod portion;

a second rod portion, having a first section axially aligned with said first rod portion, and a second section having an axis essentially parallel to said first rod portion, the end of said second section having a first loop surrounding said first rod portion;

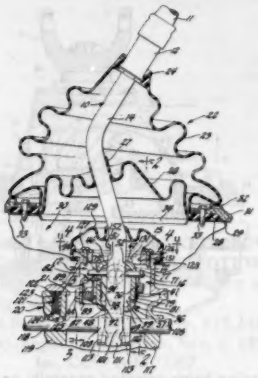
and a spring concentrically surrounding said first rod portion and acting upon said first loop.

4,018,099

MULTISPEED SHIFT LINKAGE CONTROL

Patrick H. O'Brien, Birmingham, and William J. Zabritski, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 15, 1975, Ser. No. 613,332
Int. Cl.² G05G *5/02, 9/12*
U.S. Cl. 74—473 R **5 Claims**



1. In a transmission shift control linkage; a support; a shift shaft mounted on said support for reciprocating shifting movement along its axis and rotary selecting movement about its axis and having connecting means thereon; a shift lever having a handle end and connecting means at the opposite end connected to said connecting means on said shift shaft to pivotally mount said lever on said shift shaft for selecting pivotal movement about the shift shaft axis conjointly with said rotary selecting movement of said shift shaft; a pivot bracket located at an intermediate portion of said shift lever; shifting pivot means between said pivot bracket and said support to mount the pivot bracket for shifting pivotal movement about an axis transverse to the longitudinal axis of said shift lever; guide and stop means on said pivot bracket and said shift lever to guide said lever for selecting movement relative to said pivot bracket and to limit said selecting movement at end neutral positions and to prevent relative shifting movement of said shift lever and said pivot bracket for conjoint pivotal shifting movement of said shift lever and pivot bracket; said connecting means on said shift lever and shift shaft having guide means to prevent turning of said shift lever about its longitudinal axis and motion transfer means to transfer pivotal shifting movement of said shift lever to axial shifting movement of said shift shaft.

4,018,100

SELECTION CONSOLE AND LOCKING MECHANISM FOR VENDING MACHINE

James A. Moe, 503 Carolyn Lane, White Bear Lake, Minn. 55110

Filed Aug. 20, 1975, Ser. No. 606,163
Int. Cl.² G05G *5/08, 13/02*
U.S. Cl. 74—483 PB **11 Claims**

1. In a selection console for a vending machine, the combination of

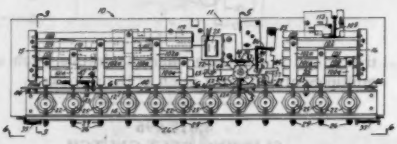
a plurality of pins reciprocatably movable independently in parallel paths,

a slide bar extending across and normal to said paths, said slide bar having a plurality of slots each receiving one of said pins, said slots having a surface to be engaged by a said pin to cause movement of said slide bar upon movement of a pin in a said path,

means defining a plurality of detents spaced along said slide bar in the direction of movement thereof,

an actuating member,

a pair of pawls pivoted on an axis,



means for biasing one of said pawls into engagement with said slide bar and the other of said pawls into engagement with said actuating member,

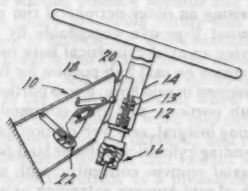
said actuating member being movably supported relative to said pawls to pivot said one pawl to permit movement of said slide bar in only one direction during movement of a said pin in one direction and restrict movement of said slide bar in the other, and to shift said pawls to restrict movement of said slide bar in said one direction upon the return movement of said pin and slide bar.

4,018,101

POSITIONING DEVICE FOR ADJUSTABLE STEERING COLUMNS

William T. Mihalic, Southfield, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 28, 1975, Ser. No. 608,414
Int. Cl.² B62D *1/18;* **G05G** *5/24*
U.S. Cl. 74—493 **18 Claims**



1. A positioning device for use with a steering column in a vehicle, the steering column being adapted to be operatively connected to the steering gear of the vehicle in a manner allowing the steering column to be translatively and pivotally moveable in the plane of the steering column, the positioning device comprising:

a support member adapted to be secured to the body of said vehicle;

an elongated slider member adapted to be fixedly secured at one end to said column;

means mounting said slider member on said support member for;

selective pivotal movement in said steering column plane between a plurality of the tilt positions thereby effecting pivotal movement of said column;

selective movement along its axis between a plurality of translational positions in each of said tilt positions thereby effecting translational movement of said column;

tilt latching means for holding said slider member in any of said tilt positions; and

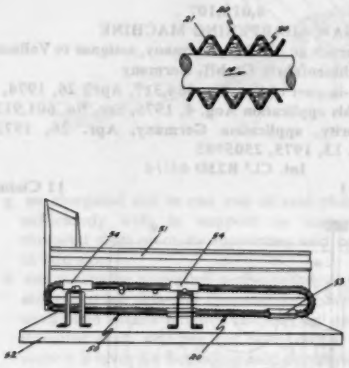
translation latching means for holding said slider member in any of said translational positions.

4,018,102

MOVEMENT DEVICE

Frederick S. Falks, Comstock Park, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.

Division of Ser. No. 310,411, Nov. 29, 1972, Pat. No. 3,883,192. This application Sept. 6, 1973, Ser. No. 394,829
Int. Cl.² F16C *1/10*
U.S. Cl. 74—501 R **3 Claims**



1. A drive pulley device comprising: a rigid, generally rod-like support of a closed circuit configuration, said support being sufficiently rigid to be self-sustaining whereby it can have a configuration suitable for any drive function and capable of passing around obstructions and the like without requiring additional pulley wheels to do so; a flexible sleeve slidably mounted on said support and entirely enclosing said support to define a closed circuit, said sleeve being filled with a lubricating fluid whereby friction between said sleeve and said rigid support is minimized; and at least two pulley wheels mounted on mounting means and supportably engaging said flexible sleeve at two spaced points whereby rotation of one of said wheels causes said sleeve to slide on said support and thereby rotate the other of said wheels.

4,018,103

CONTROL LINKAGE MECHANISM

Richard W. Chamberlain, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 14, 1975, Ser. No. 595,823
Int. Cl.² G05G *1/04*
U.S. Cl. 74—519 **11 Claims**

1. A linkage mechanism comprising:

support means;

a first link pivotally mounted on a first fixed pivot relative to the support means and pivotable in first and second directions;

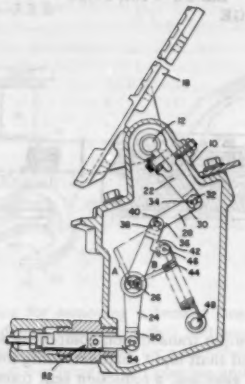
a second link pivotally mounted on a second fixed pivot relative to the support means and pivotable in first and second directions;

a third link having (i) a first portion pivotally mounted to a portion of the first link spaced from said first fixed pivot, and (ii) a second portion mounted to a portion of the second link spaced from said second fixed pivot;

the first, second and third links being arranged to provide that pivoting of the first link in said first direction thereof pivots the second link in said first direction thereof through said third link;

resilient means for resiliently resisting pivoting of the first and second links in said respective first directions thereof;

the first, second and third links being positioned so that as the first link is pivoted through the full travel thereof in said first direction thereof to pivot the second link in said first direction thereof through the third link, the third link shifts in position to provide, through the full travel of the first link, a continuously increasing effective lever arm about the second fixed pivot through which force is applied from the third link to pivot the second link in said first direction thereof.

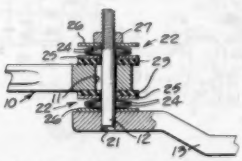


4,018,104

FRICTIONALLY HELD CONTROL LINKAGE FOR ENGINE THROTTLE CONTROLS AND THE LIKE

James R. Bland, and Rueben R. Brunka, both of Aurora, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 17, 1975, Ser. No. 558,980
Int. Cl.² G05G *5/06*
U.S. Cl. 74—531 **14 Claims**



1. A control linkage operatively connected to a control mechanism of an engine comprising

a control member movably mounted on a support member and operatively connected to said control mechanism,

a pin secured to said support member,

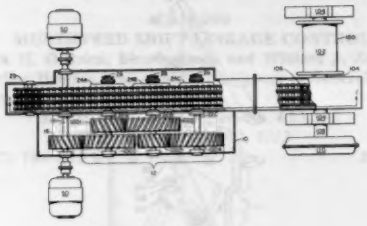
an operator's control handle operatively connected to said control member for selectively moving the same on said support member, and

means, including an annular elastomeric washer mounted on said pin and frictionally engaging a side of said control member, for frictionally holding said control member relative to said support member upon movement of said control handle.

4,018,105
MULTIPLE OUTPUT GEARED TRANSMISSION

Elbert Walker, Pampa, Tex., assignor to Cabot Corporation, Boston, Mass.

Filed May 9, 1975, Ser. No. 575,956
Int. Cl.² F16H 37/06
U.S. Cl. 74—665 GE 9 Claims

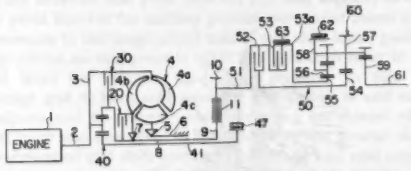


1. A multiple output transmission comprising a gearcase, a geared power input shaft input shaft extending into and being journalled to said gearcase, a reduction gear train comprising a plurality of gears journalled in said gearcase in driven communication with said geared input shaft, a plurality of power output shafts affixed to said driven gears of said reduction gear train and extending outwardly from a common side of said gearcase, a plurality of selectively clutchable rotational power output elements coupled to said outwardly extending power output shafts and a flexible continuous belt means in driven relationship with said plurality of rotational power output elements and reeved thereabout so as to be driven in a common direction upon selective clutching of any one of said rotational power output elements.

4,018,106
POWER TRANSMISSION SYSTEM

Sumio Uozumi, and Fmihiro Ushijima, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Feb. 6, 1975, Ser. No. 547,497
Claims priority, application Japan, Aug. 19, 1974, 49-94319
Int. Cl.² F16H 3/44
U.S. Cl. 74—688 5 Claims

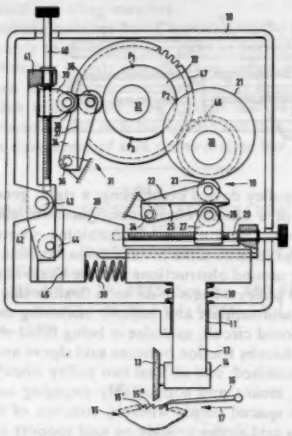


1. A power transmission system for a vehicle including an engine and a drive member for delivering power from said engine, said system comprising a fluid transmission system including an impeller and a turbine, means connecting said drive member to said impeller, a speed change gear unit including an input shaft, first clutch means operative to connect said turbine to said input shaft of said speed change gear unit, second clutch means for bypassing said fluid transmission system operative to connect said drive member with said input shaft of said speed change gear unit, and an overdrive unit including frictional coupling means mounted intermediate said engine drive member and said input shaft of said speed change gear unit, said overdrive unit being adapted to provide overdrive operation when said fluid transmission system is bypassed by operation of said second clutch means, said input shaft of said speed change gear unit being coupled to an intermediate shaft to receive power therefrom, said overdrive unit including a sun gear, pins affixed to said engine drive member, pinion means rotatably mounted about said pins, a hub member fixed to said intermediate shaft and having formed thereon a ring gear, said ring gear being arranged for intermeshing engagement with said pinion means, and a braking band for locking said sun gear against rotation, said pins being thereupon operative to transmit power to said intermediate shaft through said pinion means, said ring gear and said hub.

4,018,107
SAW SHARPENING MACHINE

Otto Stier, Biberach an der Riss, Germany, assignor to Vollmer Werke Maschinenfabrik GmbH, Germany

Continuation-in-part of Ser. No. 464,317, April 26, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,912
Claims priority, application Germany, Apr. 26, 1973, 2321160; Feb. 13, 1975, 2505985
Int. Cl.² B23D 63/14
U.S. Cl. 76—41 11 Claims



1. A saw sharpening machine having a grinding tool and a saw blade mounting with a push rod reciprocating in a lifting direction to vary the spatial relation of the grinding tool and saw blade, a cam and follower drive for the push rod including a rocker arm carrying the follower and an adjustable carriage actuated by the rocker arm developing the reciprocation of the push rod, a slide member forming a part of said push rod and adjustably slidable on the push rod transversely of the direction of reciprocation, and an additional lifting drive shifting said slide to impart first a positive and then a negative lifting action to the push rod.

4,018,108
DEVICE FOR SETTING CIRCLE SAWS

Alex Dudley, 220 Edgewood Road, Lansing, Mich. 48910

Filed Aug. 4, 1975, Ser. No. 574,361
Int. Cl.² B23D 63/02
U.S. Cl. 76—63 2 Claims

1. A circular saw setting apparatus comprising, in combination:

a. a bench supporting an elongated channel iron base, and means for locking said base to said bench;

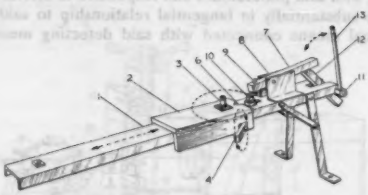
b. a slidable open-end box supporting a saw holding arbor, means for locking said slidable box at any required point on said channel iron base;

c. an anvil received through a slot in said channel iron base, means for adjusting said anvil elevationally and longitudinally;

d. means for securing a circular saw on said saw holding arbor, and means for adjusting the peripheral edge of said saw in operable contact with said anvil;

e. two angle iron plates so spaced as to support between them a metal bar arm, means for pivotally supporting said bar arm between said plates;

f. a tool bit set in a striking end of said bar arm and secured with set screws;



g. an elongated slot in one end of said channel iron base sufficiently wide to support an eccentric throw, a threaded shaft pivotally supporting said eccentric throw in said slot;

h. and means for activating said eccentric throw to thereby move said bar arm and thus said tool bit set against said anvil, said means being a hex nut on one end of said threaded shaft, said hex nut being drilled on all flats to receive a lever for activating said eccentric throw.

4,018,109

FEED DEVICE FOR SAW MACHINING APPARATUS

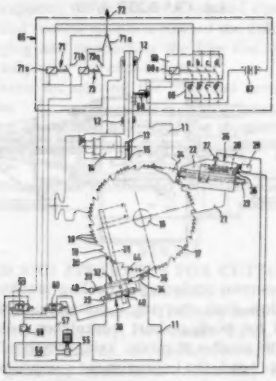
Otto Stier, Biberach an der Riss, Germany, assignor to Vollmer Werke Maschinenfabrik GmbH, Germany

Filed Aug. 27, 1975, Ser. No. 608,381

Claims priority, application Germany, July 31, 1975, 2534289

Int. Cl.² B23D *63/08*

U.S. Cl. 76—77 12 Claims



1. A saw feeding device for a saw machining apparatus which comprises a first mechanism acting on a saw in the machine to advance the saw a preset distance, a second mechanism acting on the saw to advance the saw in the machine in the same direction as the first mechanism a preset distance beyond the distance advanced by the first mechanism, and control means selectively activating said mechanisms for accurately positioning the teeth of the saw for a machining operation by said machining apparatus.

4,018,110

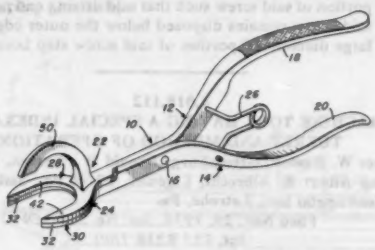
STOPPER REMOVER

Samuel C. Spriggs, 1076 Shadow Lane, Mount Pleasant, S.C. 29464

Filed July 13, 1976, Ser. No. 704,779

Int. Cl.² B67B *7/02*

U.S. Cl. 81—3.1 B 6 Claims



1. A device for removing a headed stopper from a container, said device comprising first and second jaws, handle means engaged with said jaws for a manipulation of said jaws between a first overlying closed position and a second spaced open position, said first jaw comprising force reaction means for engaging and positioning said device on a container adjacent a stopper to be removed, said second jaw including force transmitting means engageable below the head of a stopper and between the stopper head and the container for effecting an upwardly directed stopper removing force on the head of a stopper, said second jaw also including retaining means extending in outwardly spaced overlying relation to said force transmitting means and engageable over the head of a stopper for a retention thereof within the second jaw as the stopper removing force is being applied.

4,018,111

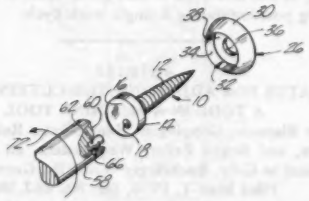
TAMPER RESISTANT FASTENER AND TOOL FOR OPERATING SAME

Marvin L. Goldhaber, 10005 Talbot, Huntington Woods, Mich. 48070

Filed Sept. 2, 1975, Ser. No. 609,385

Int. Cl.² B26D *5/30*

U.S. Cl. 81—71 5 Claims



1. A tamper resistant fastener comprising:

a screw having a threaded body with a driving end portion having a circular contour, said driving portion end having a bore located eccentrically with respect to the longitudinal axis of said screw;

a retainer having a circular step bore receiving said screw such that said threaded body extends through the smaller diametered portion of said step bore while the driving end portion of said screw is disposed within the larger diametered portion of said step bore such that said driving end portion of said screw is below the outer edge of the larger diametered portion of said step bore; and

a tool for drivingly engaging said screw, said tool comprising:

a driving member having an end with a circular contour sized to be received within said large diametered portion of said step bore of said screw and abuttingly engaging the upper surface of said driving end portion;

key means carried by said end of said driving member and received in said bore of said driving end portion; and

means carried by said driving member for engaging said retainer to maintain said retainer at said driving end portion of said screw such that said driving end portion of said screw remains disposed below the outer edge of the large diametered portion of said screw step bore.

4,018,112

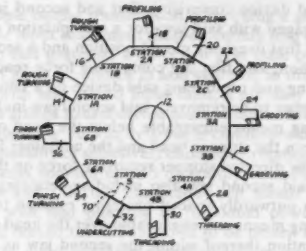
MACHINE TOOL HAVING A SPECIAL INDEXABLE TURRET AND METHOD OF OPERATION

James W. Heaton, Greensburg; Donald W. Warren, Latrobe, and Albert B. Albrecht, Ligonier, all of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Nov. 29, 1974, Ser. No. 528,159

Int. Cl.² B23B *1/00*

U.S. Cl. 82—1 C **6 Claims**



1. In a method of operating a machine tool which includes an indexable turret with a plurality of tool stations each having a cutting tool unit of a respective type therein and each tool unit being presentable in workpiece operating position in a respective indexed position of the turret, said method comprising; providing a group of at least two identical tool units, placing the identical tool units in adjacent ones of said turret stations, indexing the turret a predetermined number of times for a complete rotation thereof during a complete work cycle to present respective tool unit types carried thereby sequentially to workpiece operating position, and presenting a single one only of the tool units of said group thereof to workpiece operating position during a single work cycle.

4,018,113

APPARATUS FOR ADJUSTING THE CUTTING EDGE OF A TOOL IN A MACHINE TOOL

Miroslav Blazenin, Goppingen; Hans-Günter Rohs, Rechberghausen, and Bruno Zeller, Weissenstein, all of Germany, assignors to Gebr. Boehringer G.m.b.H., Germany

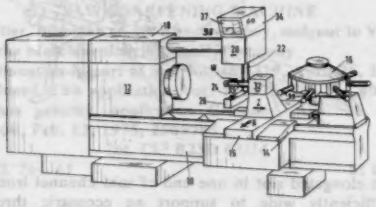
Filed Mar. 1, 1976, Ser. No. 662,380

Claims priority, application Germany, Mar. 5, 1975, 2509586

Int. Cl.² B23B *25/06*

U.S. Cl. 82—2 B **4 Claims**

1. In a machine tool of the type including a bed, a tool support, means for mounting said tool support on said bed for relative movement in a first direction and in a second direction at right angles to said first direction, feeding means for feeding said tool support in said directions, and control means for controlling said feeding means, the combination comprising a projector mounted on said bed at a distance from the tip of a tool mounted on said tool support and including optical means for producing a picture of a cutting edge of said tool tip within a plane, the axis of said optical means extending at right angles to said feeding directions, said picture travelling in a first travel direction within said plane, when said support is fed in said first direction, and travelling in a second travel direction, when said support is fed in said second direction, a single electronic integrated circuit element forming a linear photodiode array mounted in stationary relationship to said bed within said plane and extending parallel to said second travel direction and in the path described by said picture when travelling in said first travel direction, detecting means connected with said photodiodes and responsive to arrival of said picture substantially in tangential relationship to said array, electrical means connected with said detecting means and



with said control means and being operative in response to said arrival to start a feed of said support which causes said picture to travel into a transitional position located on the longitudinal axis of said array and spaced from said array and, thereafter, to travel in said second direction towards said array and into an overlapping relationship to a predetermined photodiode of said array, and registering means connected with said array and with said electrical means to register the positions of said support, when said picture arrives in said tangential relationship and in said predetermined overlapping relationship.

4,018,114

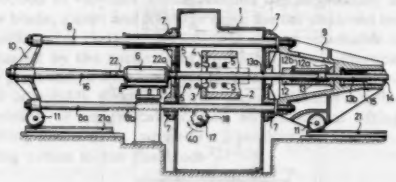
DEVICE ON PEELING MACHINE

Klaus Heiermann; Carl-Ludwig Pohler, and Joachim Bertenburg, all of Solingen, Germany, assignors to Th. Kieserling & Albrecht, Solingen, Germany

Filed Sept. 30, 1975, Ser. No. 618,018

Int. Cl.² B23B *5/00*

U.S. Cl. 82—20 **7 Claims**

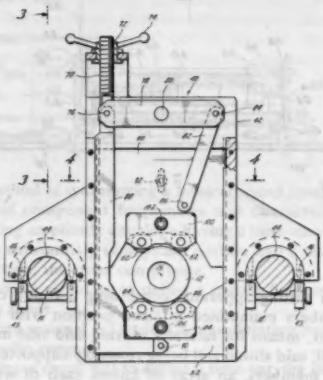


1. In an apparatus including a peeling machine having a stationary hollow shaft carrying a cutter-head, the machine being adapted for peeling short workpieces including those having a length smaller than the axial length of the hollow shaft and cutter head, the improvement comprising: clamping means constructed and arranged to axially move as a whole relative to said cutter head and including a single clamping carriage; said clamping means further comprising first and second clamping elements adapted to securely clamp by frictional engagement axially opposed external ends of a workpiece externally of the cutter head and means for axially moving both of said clamping elements in unison and said clamped workpiece through the hollow shaft and said cutterhead while maintaining the workpiece in clamped condition during the entire peeling operation.

4,018,115
SELF-CENTERING STEADY REST FOR A MACHINE TOOL

Francis D. Logan, Houston, Tex., assignor to Camco, Incorporated, Houston, Tex.

Filed Mar. 29, 1976, Ser. No. 671,216
Int. Cl.² B23B *25/00*
U.S. Cl. 82—39 **4 Claims**



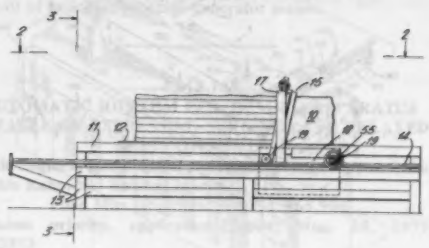
1. A self-centering steady rest for supporting the free end of a cylindrical workpiece held in the chuck of a drilling machine having a pair of ways and a drill tool support slidably supported from the ways comprising,
   a base adapted to be secured to the ways of the drilling machine,
   a first support including a first pair of supporting rollers and movably connected to the base on one side of the axis of the chuck,
   a second support including a second pair of supporting rollers and movably connected to the base on the opposite side of the axis of the chuck from the first support,
   said first and second supports being positioned for supporting the first pair of rollers and the second pair of rollers an equal distance from the axis of the chuck,
   means connected between the base and said first and second supports for simultaneously and equally moving said first and second supports toward the axis of the chuck for engaging and supporting the free end of the workpiece coaxially with the chuck axis,
   said means for moving the first and second supports includes,
      an arm connected to one of the supports,
      a pivoting lever connected to the other of said supports, and
      actuating means connected to the arm and lever.

4,018,116
METHOD AND APPARATUS FOR CUTTING PLASTICS MATERIALS

Peter Treffner, and Charles Treffner, both of 43 Yangoora Road, Belmore, Sydney, New South Wales, Australia

Filed Feb. 21, 1975, Ser. No. 551,631
Claims priority, application Australia, Feb. 27, 1974, 6747/74
Int. Cl.² B26D *4/00, 7/10*
U.S. Cl. 83—4 **7 Claims**

1. Apparatus for cutting a body of rigid plastics foam material comprising in combination;
   a. means for supporting said body of plastics material;
   b. a plurality of cutting elements including at least one set of substantially co-planar mutually parallel cutting elements;
   c. means for oscillating the cutting elements of said set so that any pair of mutually adjacent cutting elements of said set oscillate directly out of phase with each other;
   d. means for heating said cutting elements to a temperature not exceeding the fusion temperature of the plastics material to be cut; and
   e. means for causing relative movement between said body and said cutting elements in a direction having a component perpendicular to the plane defined by said set of cutting elements;

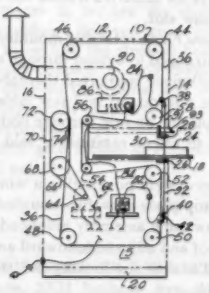


   f. said cutting elements having a length greatly in excess of their maximum cross sectional dimension, and a cross section which varies along the length of each element, whereof those parts protruding furthest from the longitudinal axis of each element lie in a smooth notional envelope of constant cross section; the ratio of the maximum to minimum cross sectional dimension of that envelope being less than 2 to 1.

4,018,117
CUTTING METHOD AND MACHINE EMPLOYING HEATED RECIPROCATING WIRE

Jan J. Patterson, 2450 Rollingview Drive, Smyrna, Ga. 30080

Filed Aug. 18, 1975, Ser. No. 605,732
Int. Cl.² B26F *3/12*
U.S. Cl. 83—16 **21 Claims**

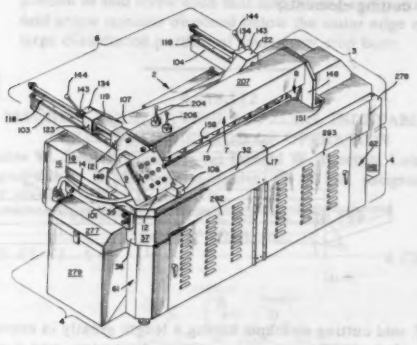


1. In a cutting device: an elongated cutting wire, support means for elongating and supporting said cutting wire at spaced locations for reciprocating to be engaged by a material (including sheet plastic and the like) for the cutting thereof, drive means for driving said support means to reciprocate said wire substantially to retrace the path of the wire in one direction of substantial longitudinal movement and thence in the opposite direction, and electrical means connected to said wire for supplying electrical current to cause said wire to become heated to maintain a cutting temperature in excess of 1,000° F. while in motion.

4,018,118
HIGH SPEED PRECISION METAL CUTTING SAW ASSEMBLY

Edward W. Goff, 1165 Ribier Court, Sunnyvale, Calif. 94087

Filed Nov. 25, 1974, Ser. No. 526,847
Int. Cl.² B23D 45/02; B26D 7/00
U.S. Cl. 83—167 25 Claims



1. A high speed precision metal cutting power saw assembly, comprising:

a. a saw table assembly including front and rear sections having horizontal plate portions with corresponding surfaces arranged in planar alignment and connected in spaced relation to define a saw slot therebetween;

b. a saw table support base assembly including a pair of pedestals spaced to underlie opposite ends of said saw table assembly whereby said front and rear sections thereof span the space between the pedestals and are supported thereby so that said corresponding surfaces of said front and rear sections lie in planar alignment;

c. a saw blade carriage assembly mounted on said saw table assembly below said horizontal plate portions and including:

1. elongated carriageways extending longitudinally of the saw table assembly and parallel to said saw slot,

2. a saw blade carriage body movably mounted on said carriageways for selective translation therealong parallel to said saw slot,

3. a circular saw blade rotatably mounted on said carriage body and arranged to extend through said saw slot so as to cut a workpiece supported thereabove on said horizontal plate portions of said saw table assembly, and

4. a motor mounted on said carriage body and operatively connected to effect rotation of said saw blade when energized;

d. means for accurately positioning a workpiece to be cut including a stop plate movably mounted on the rear section of the saw table assembly independently of the front section thereof and adjustable toward and away from said saw slot, and means for locking the stop plate in a selected position;

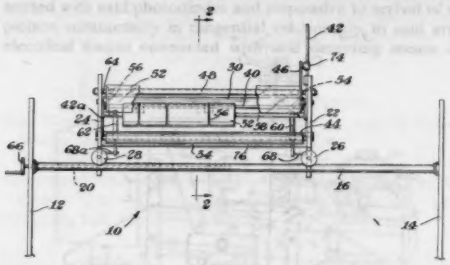
e. means for clamping a workpiece to be cut to the saw table assembly including a plurality of independently operated rams adapted to selectively impinge on the workpiece; and

f. means for effecting translation of the saw blade carriage body along said carriageways whereby said saw blade passes along said saw slot, said means including a toothed rack mounted on said saw table assembly parallel to said carriageways and a motor driven pinion on said carriage body operatively engaging the toothed rack whereby rotation of the pinion effects movement thereof and of said carriage body longitudinally along the carriageways.

4,018,119
FILM SLITTING APPARATUS

Forrest R. Lennox, Coleman, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1976, Ser. No. 682,935
Int. Cl.² B26D 5/02, 7/06
U.S. Cl. 83—425.3 6 Claims

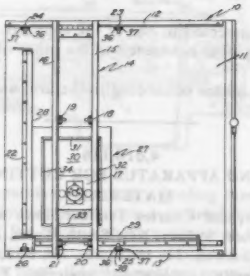


1. Film slitting apparatus comprising a frame comprising side members maintained in fixed position with respect to each other, means for laterally moving said side members, a slitted roll, said slitted roll being rotatably supported between said side members, an array of knives each of which has a cutting edge, knife supporting means extending between said side members adjacent to said slitted roll, each of said knives being coupled to said knife supporting means with its blade extending into a slit in said slitted roll, the cutting edge of said blade extending towards the outer surface of said roll, and means for moving said knife supporting means toward and away from said slitted roll.

4,018,120
STOP ATTACHMENT FOR MAT CUTTING DEVICE

John B. Pastore, 34 Fox Ridge Crescent, Warwick, R.I. 02886

Filed Apr. 15, 1976, Ser. No. 677,312
Int. Cl.² B26D 5/10, 7/26
U.S. Cl. 83—529 5 Claims

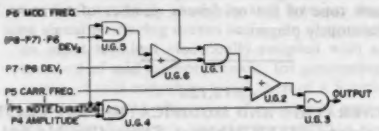


1. In a mat cutting device wherein plural sheets are to be cut to provide different size openings in each sheet, said device comprising a cutter carriage, means to guide the carriage, primary stop means to be engaged by the carriage to limit the movement of the carriage along said means to enable a first sized opening to be cut, second stop means removably mounted on said primary stop means to change the stop position of the carriage whereby a second sheet may be cut with finite dimensional difference.

4,018,121
METHOD OF SYNTHESIZING A MUSICAL SOUND

John M. Chowning, Palo Alto, Calif., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Continuation-in-part of Ser. No. 454,790, March 26, 1974, abandoned. This application May 2, 1975, Ser. No. 573,933
Int. Cl.² G10H 1/00, 5/00
U.S. Cl. 84—1.01 14 Claims



1. A method of synthesizing a musical sound composed of a plurality of component frequencies and characterized by a time-varying amplitude envelope having a time-varying attack portion, a substantialy steadystate portion and a time-varying decay portion, the steps comprising,

generating a signal ω_c to define a carrier frequency in the audio range,

generating a signal ω_m to define a modulation frequency in the audio range,

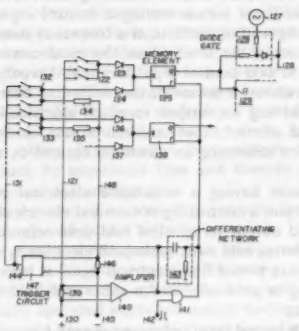
generating a signal $I(t)$ to define a time-varying modulation index,

frequency modulating ω_c with ω_m to form a frequency modulated wave defined by $e = A\sin[\omega_c t + I(t)\sin\omega_m t]$ where e defines the instantaneous amplitude of said wave, A defines the peak amplitude of said wave, and $[\omega_c t + I(t)\sin\omega_m t]$ defines the frequency spectrum of said wave wherein the frequency spectrum of said wave changes as a function of the modulation index $I(t)$ to form a representation of said sound.

4,018,122
ELECTRONIC MUSICAL INSTRUMENT WITH AUTOMATIC BASS ACCOMPANIMENT

Tijmen van der Kooij, Bodegrave, Netherlands, assignor to B.V. "Eminent" Fabriek van Electronische Orgels, Bodegraven, Netherlands

Continuation-in-part of Ser. No. 443,375, Feb. 19, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,827
Int. Cl.² G10F 1/00
U.S. Cl. 84—1.03 20 Claims

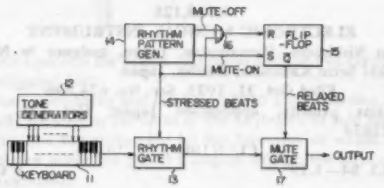


1. In an electronic musical instrument having bass program generator means for furnishing a rhythmic bass program: an accompaniment system, comprising, in combination, a plurality of input means for furnishing a plurality of input signals each in response to activation of a corresponding one or a corresponding combination of said input means; reduction circuit means connected to said input means for furnishing one of a plurality of predetermined tone or chord signals in response to each of said input signals, said plurality of predetermined tone or chord signals being substantially less in number than said plurality of input signals, said reduction circuit means having five outputs, said chord signals comprising 32 5 bit words; and output means connected to said reduction circuit means and said bass program generator means and including a sound reproduction system for furnishing a sound output in response to said tone or chord signals and under control of said bass program generator means.

4,018,123
AUTOMATIC RHYTHM PERFORMING APPARATUS CAPABLE OF EXPRESSING STRESSED AND RELAXED BEATS OF RHYTHM

Toshio Sugiura, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Mar. 15, 1976, Ser. No. 666,906
Claims priority, application Japan, Mar. 20, 1975, 50-33573
Int. Cl.² G01H 1/00
U.S. Cl. 84—1.03 10 Claims



1. An automatic rhythm performing apparatus comprising:

rhythm pattern generating means for generating stressed beat pattern pulses representative of stressed beats of a rhythm to be generated and relaxed beat pattern pulses representative of relaxed beats of the rhythm;

tone signal generating means;

rhythm gate means coupled to said tone signal generating means to receive a tone signal and to said rhythm pattern generating means to receive the stressed beat pattern pulses for providing a decayed envelope to the tone signal in response to each of the stressed beat pulses; and

mute gate means coupled to said rhythm gate means to receive the decayed tone signal and to said rhythm pattern generating means to receive the relaxed beat pattern pulses for suppressing a portion of the output tone signal of said rhythm gate means in response to each of the relaxed beat pulses.

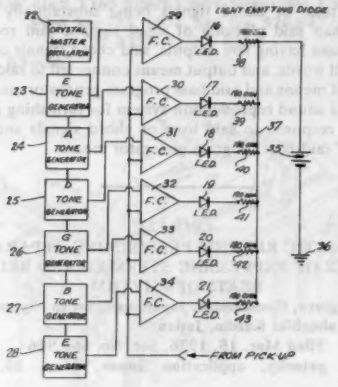
4,018,124
AUTOMATIC GUITAR TUNER FOR ELECTRIC GUITARS

Ruperto L. Rosado, 2231 Nothrop Ave., Sacramento, Calif. 95825

Filed Nov. 26, 1975, Ser. No. 635,766
Int. Cl.² G10D 5/00
U.S. Cl. 84—1.16 4 Claims

1. An electric guitar attachment for tuning the guitar comprising a plurality of standard tone generators for generating the correct tone frequency desired to the guitar strings, a light emitting diode positioned beneath each of the strings of the guitar, a pick-up mounted beneath each of the strings of the guitar, a plurality of frequency comparators mounted within the guitar and electrically connected respectively to said tone generators and to said light emitting diodes, means electrically connecting a respective one of said tone generators and a

respective one of said light emitting diodes to said frequency comparator to illuminate said light emitting diodes upon



matching of frequencies in each of said frequency comparators.

4,018,125

ELECTRONIC MUSICAL INSTRUMENT

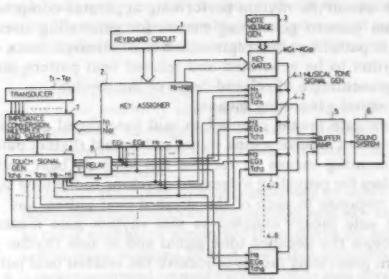
Tetsuo Nishimoto, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Oct. 21, 1975, Ser. No. 624,496

Claims priority, application Japan, Oct. 24, 1974, 49-122854

Int. Cl.² G10H 1/02, 5/02

U.S. Cl. 84—1.19 **6 Claims**



1. An electronic musical instrument capable of time-shared multiplexing of information identifying a plurality of depressed keys by respective channels equal in number to a maximum number of musical tones to be simultaneously played which is substantially smaller than the number of tones that can otherwise be played, and producing and simultaneously playing musical tones corresponding to the depressed keys in response to the multiplexed information, said instrument comprising:

a. transducers for detecting a characteristic of the finger touch applied to each key upon depression thereof and producing a touch detection signal in accordance therewith;

b. a circuit for sampling, by each corresponding key, the touch detection signals for the respective keys produced by said transducers, the sampling being in synchronization with said time-shared multiplexing of the depressed key information and being such that the sampled touch detection signals themselves are multiplexed in a time-sharing manner;

c. a touch signal generation circuit, including capacitors for storing the time-shared multiplexed touch detection signals by each channel and discharging circuits for said capacitors, for delivering out voltages at one terminal of said capacitors as touch signals; and

d. a musical tone signal generation system including control means for controlling at least one parameter among the pitch, tone color and volume parameters of the musical tones corresponding to the depressed keys in accordance with said touch signals, whereby touch control is realized for each tone of the maximum number of tones to be simultaneously played.

4,018,126

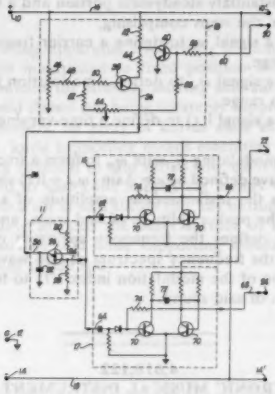
TONE GENERATION AND MODIFICATION APPARATUS

Brian I. Walmann, 6823 N. Michigan, Kansas City, Mo. 64118

Filed Mar. 26, 1975, Ser. No. 562,357

Int. Cl.² G10H 1/02, 3/00, 1/04; H03H 7/10

U.S. Cl. 84—1.24 **29 Claims**



1. In apparatus for generating an audio frequency electrical signal adapted for transduction to produce a series of audible tones providing a musical effect:

time reference means having an output terminal, for generating and presenting at said output terminal thereof a first electrical signal having the character of a series of pulses occurring at a first repetition rate,

said time reference means including current controlled, clock oscillator means having a control input terminal and configured to oscillate at a frequency determined as a function of the level of an electrical control current applied to said control input terminal thereof,

said time reference means further including current source means having an output terminal electrically coupled with said control input terminal of said clock oscillator means for delivering an electrical control current to the latter;

gating means having a switchable electrical path therethrough and a control input terminal electrically coupled with said output terminal of said time reference means, for rendering said switchable path electrically conductive in response to said first electrical signal at intervals corresponding in predetermined manner with said first repetition rate;

variable electrical level reference means having an output terminal, for generating and presenting at said output terminal thereof a second electrical signal having the character of a series of sawtooth waves occurring at a second repetition rate and each having an instantaneous level varying as a function of time;

memory means having an output terminal and an input terminal electrically coupled with said output terminal of

said level reference means through said switchable path of said gating means, for storing the instantaneous level of said second electrical signal whenever said switchable path is electrically conductive and for presenting at said output terminal thereof a third electrical signal having the character of a stepped-level wave in which the successive steps are initiated at intervals corresponding in predetermined manner with said first repetition rate and are of levels corresponding in predetermined manner with the instantaneous level of said second electrical signal that was last previously stored by said memory means; and

tone signal producing means having an output terminal and an input terminal electrically coupled with said output terminal of said memory means, for generating and presenting of said output terminal thereof a fourth electrical signal having the character of a series of tone-representing, audio frequency waveforms occurring in time concurrence with the steps of said third electrical signal and of frequency corresponding in predetermined manner with the concurrent level of said third electrical signal.

4,018,127

ELECTRONIC MUSICAL INSTRUMENT

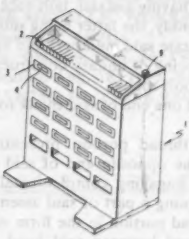
David W. Biro, 14 Hillside Lane, Yalesville, Conn. 06492

Filed June 2, 1975, Ser. No. 582,790

Claims priority, application United Kingdom, Nov. 25, 1974, 50864/74

Int. Cl.² G10H *3/00*

U.S. Cl. 84—1.28 **9 Claims**



1. A musical instrument, comprising:

a. a plurality of magnetic tape player means for driving and transducing an endless magnetic tape having sound intelligence recorded thereon; each player means comprising a transducing means for transducing a magnetic tape and tape drive means for transporting the magnetic tape across the transducing means, the tape drive means of each player means being operated independently of the tape drive means of the other player means; a plurality of said player means each having operatively associated therewith an endless magnetic tape having sound intelligence recorded thereon; each player means being operable, when energized and in the play mode, independently of the other player means, continuously to drive and transduce its associated tape and thereby continuously produce an output signal;

b. means connected to the player means for mixing and amplifying said output signals;

c. audio means connected to said mixing and amplifying means for audibly broadcasting the output of said mixing and amplifying means applied thereto; and

d. manually operated keyboard means having a plurality of keys for selecting the sound information of a desired tape, said keys being movable between a normally raised position and a depressed position, and a plurality of normally open switch means operated by said keys to remain closed for as long as a key associated with a switch means is manually held in the depressed position and to open when the key moves to the raised position, there being a key for each switch means and a switch means connected in circuit with each said player means and said mixing and amplifying means; said audio means being operable continuously to broadcast an audible tone corresponding to the sound intelligence on the tapes selected by depressing one or more of said keys for as long as said keys are depressed.

4,018,128

PEDAL OPERATOR FOR PIANO AND THE LIKE

Robert Luther Megee, 8250 Lankersheim, North Hollywood, Calif. 91605

Filed Jan. 12, 1976, Ser. No. 648,263

Int. Cl.² G10C *3/26*

U.S. Cl. 84—231 **5 Claims**

1. An operator for pedals of a piano and the like comprising an elongated bar;

means positioning said bar adjacent to and extending generally parallel to the front of the keyboard of said piano or the like for movement by the forearms or wrists of the player while the player's fingers engage the keys of said keyboard;

means for engaging a pedal of said piano or the like; and

means coupling said operator to said engaging means to deflect said pedal upon the movement of said operator.

4,018,129

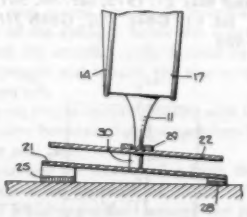
END-PIN HOLDER FOR STRING INSTRUMENTS

Ralph Hollander, 425 W. 57th St., New York, N.Y. 11220

Filed Nov. 26, 1974, Ser. No. 527,220

Int. Cl.² G10D *3/02*

U.S. Cl. 84—294 **4 Claims**



1. A resonating holder for a string instrument having a body formed by a sound box provided with a back plate acoustically coupled to a top plate by a sound post, the body having an end-pin extending from the lower end thereof, the end-pin when in direct engagement with the ground producing a dampening effect, said holder comprising:

A. a back plate provided with ground-engaging feet formed of material serving to acoustically isolate the back plate from the ground whereby the back plate floats acoustically and is free to vibrate,

B. a top plate supported in spaced relation above said back plate to define an open zone therebetween,

C. a sound post interposed between and acoustically inter-

coupling said top plate and back plate, each plate being characterized by multiple natural resonance frequencies, and

D. a socket for receiving the end-pin of the instrument and mounted on said top plate whereby said back plate and said top plate are excited into vibration by instrument vibrations transmitted thereto through said end-pin and said holder serves to acoustically reinforce said instrument without damping, said top and back plates being formed of material acoustically compatible with the top and back plates of the instrument being played.

4,018,130

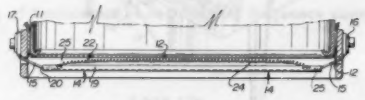
SNARE ASSEMBLY

Frank J. Gariepy, Sr., Montreal, Canada, assignor to John H. Chartbrand and Robert E. Chartbrand, Ottawa, Canada, a part interest to each

Filed Jan. 20, 1976, Ser. No. 650,681

Int. Cl.² G10D *13/02*

U.S. Cl. 84—415 **9 Claims**



1. A snare assembly for use with a snare drum, comprising an elongate mounting frame; a pair of carrier means positioned at locations spaced longitudinally of said mounting frame; and a series of generally parallel snare strands extending longitudinally between and each attached at opposite end portions thereof to respective ones of said carrier means, said carrier means supporting said snare strands in an outwardly bowed configuration such that the lengths of the snare strands between said end portions project outwardly of said mounting frame and said carrier means and can be engaged resiliently against the lower drum head of the snare drum while the carrier means and mounting frame remain out of contact with the lower drum head.

4,018,131

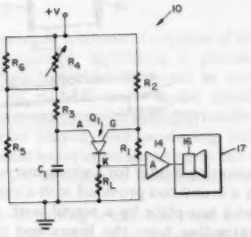
ELECTRONIC METRONOME

Robert L. Cannon, 17 Lakeview Terrace, Waltham, Mass. 02154

Filed May 27, 1975, Ser. No. 581,132

Int. Cl.² G04F *5/02*; **G08B** *3/10*

U.S. Cl. 84—484 **9 Claims**



1. An electronic metronome comprising:

circuit means providing a plurality of pulses;

timing means in circuit association with said circuit means for controlling the rate of said pulses and including:

a linear potentiometer;

a compensation network for providing a non-linear sequence of pulse rates in response to uniform incremental adjustment of said linear potentiometer to provide a non-linear sequence of tempi calibrations according to Maelzel markings;

means for manual adjustment of said linear potentiometer; and

output means operative in response to said pulses to provide an output indication of tempo.

4,018,132

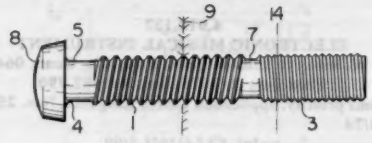
CONNECTING-ROD BOLT

Michio Abe, Kasugai, Japan, assignor to Tokai Cold Forming Co., Ltd., Kasugai, Japan

Continuation of Ser. No. 480,378, June 18, 1974, abandoned, which is a continuation of Ser. No. 389,245, Aug. 17, 1973, abandoned, which is a continuation of Ser. No. 172,974, Aug. 23, 1971, abandoned. This application July 24, 1975, Ser. No. 598,725

Int. Cl.² F16B *27/00*

U.S. Cl. 85—1 L **4 Claims**



1. A self-tightening fastening bolt for interconnecting separable members having coaxial, bolt-receiving bores therein to present an assembly, the latter being subjected to tensile loads tending to separate said members and elongate said bolt, said fastening bolt being of unitary construction and comprising:

an elongate bolt shank;

a bolt head at one end of said shank for engaging one of said members;

a fastening thread portion presenting fastening threads adjacent the opposite end of said shank configured for fastenably engaging complementally threaded fastening means forming a part of said assembly; and

a fitting thread portion in the form of a single, continuous fitting thread between said head and fastening thread portion and spaced from the latter with an unthreaded shank portion therebetween, said fitting thread portion being of length to bridge said members when the bolt is operably positioned within said coaxial bores and of a diameter to fit closely within the latter,

the root diameter of said fitting thread portion being less than that of said fastening thread portion, and less than the diameter of said unthreaded shank portion, for causing the majority of the elastic elongation of said bolt under said tensile loads to occur in the region of said fitting thread portion,

the threads of said fitting and fastening thread portions being reversed in hand relative to each other, with the pitch of the fitting thread being greater than the pitch of the fastening threads, for causing said bolt to twist during said tensile load-induced elongation in a direction for screwing said fastening thread portion into said fastening means to thereby self-tighten said bolt.

4,018,133

CAPPED WHEEL NUT

Joseph W. Chaivre, and Albert A. Jadach, both of Royal Oak, Mich., assignors to Towne Robinson Fastener Company, Southfield, Mich.

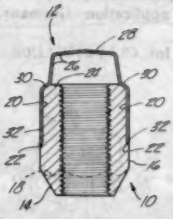
Filed Oct. 31, 1975, Ser. No. 627,613

Int. Cl.² F16B *37/14*

U.S. Cl. 85—35 **10 Claims**

1. A capped nut for use with a vehicle axle hub having a projecting stud and a wheel having conical depressions

adapted to surround the stud, comprising: a nut body having a conical end adapted to mate with said depression and polygonal wrench flats forming the body sides, the wrench flats being recessed adjacent the end opposite to the conical end, the recessed wrench flats being parallel to non-recessed wrench flats adjacent the conical end and extending closer to the



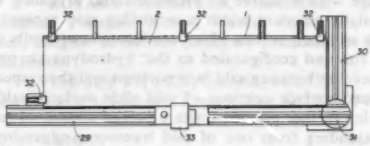
central axis of the nut than the non-recessed wrench flats and being joined to the non-recessed wrench flats by a shoulder extending transversely to the axis of the nut; and a sheath formed of sheet material having a section closing the end of the nut opposite to the conical end and sections extending over the recessed wrench flats with the edge of the sheath in proximity to said shoulder.

4,018,134

APPARATUS FOR TRIMMING AND EDGE-CUTTING A PLATE-LIKE METALLIC WORKPIECE

Ernst Linsinger, Steyrermuhl, Austria

Division of Ser. No. 400,266, Sept. 24, 1973, Pat. No. 3,922,951. This application Aug. 18, 1975, Ser. No. 605,304
Int. Cl.² B23C *3/12*; B24B *9/04*
U.S. Cl. 90—15 R **6 Claims**



1. Apparatus for trimming and edge cutting a plate-like metallic workpiece having a major face and a plurality of edges narrower than said major face and bounding the same, comprising:

a. a base;

b. a first, straight, elongated guide track fixedly mounted on said base;

c. supporting means on said base for supporting said workpiece in a position in which said face extends in a predetermined plane parallel to said first guide track;

d. a second straight guide track fixedly mounted on said base, said second guide track being elongated at right angles to said first guide track and parallel to said plane;

e. interconnecting means interconnecting said first and second guide tracks in a common plane, said interconnecting means including a turntable;

f. at least one milling cutter unit, said at least one unit including

1. a carrier,

2. engagement means shaped for engagement with each of said first and second guide tracks on said carrier engagement with at least one said guide tracks for longitudinally guided movement of said at least one unit on the engaged guide track,

3. a milling cutter,

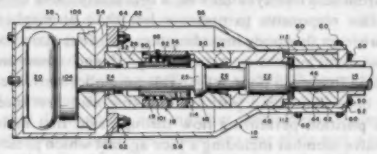
4. guide means for guiding said milling cutter on said cutter transversely to the direction of elongated of the engaged guide track toward and away form an edge of said workpiece.

4,018,135

HYDRAULICALLY POWERED IMPACT DEVICE

Raymond E. Lance, Fort Worth, and Ronald N. James, Arlington, both of Tex., assignors to Construction Technology, Inc., Grand Prairie, Tex.

Filed Dec. 26, 1973, Ser. No. 428,093
Int. Cl.² F01B *7/18*; F01L *17/00*; F16J *15/18*
U.S. Cl. 91—321 **14 Claims**



1. A hydraulic impact device comprising

a cylinder member having a lower gland portion, a center portion having a stepped bore with an upper section having a diameter less than a lower section, and an upper gland portion,

a hammer member reciprocally disposed in the cylinder having lower and upper shaft portions slidably and sealingly received in the lower and upper gland portions, respectively, and a piston portion disposed generally in the center portion, the piston portion having a diameter less than the maximum diameter of the stepped bore to permit fluid to bypass the piston within the bore and permit the hammer member to be driven downwardly by an external biasing force,

a sleeve valve reciprocally disposed within the cylinder member around the upper shaft portion, the sleeve valve having a first peripheral seal with the upper section of the stepped bore and a second peripheral seal with the lower section of the stepped bore to form an annular cavity between the first and second peripheral seals, the sleeve valve and the cylinder member, and a first annular portion on said sleeve valve forming a seal with the upper face of the piston section, the effective diameter of the first annular seal being less than the diameter of the lower section of the stepped bore and greater than the diameter of the upper section of the stepped bore,

high pressure port means continually communicating with the interior of the cylinder below the second peripheral seal and with the annular cavity formed by the first and second peripheral seal means, the sleeve valve, and the clyinder member,

low pressure port means communicating with the interior of the sleeve valve between the first peripheral seal and the first annular seal, and

means for separating the sleeve valve from the piston portion at the top of the stroke of the piston to break the first annular seal and bypass fluid around the piston portion and within the bore to allow the piston portion to be driven downwardly by the external biasing force applied to the hammer member.

4,018,136

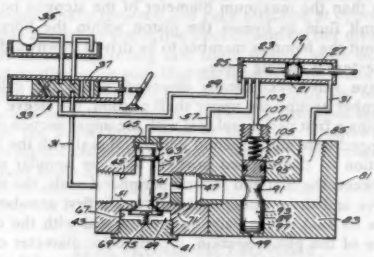
HYDRAULIC APPARATUS FOR CONTROLLING MOVEMENT OF A MEMBER UNDER LOADING

Lorell D. Kaetterhenry, Rte. No. 1, Hartford, Wis. 53027

Filed Dec. 18, 1974, Ser. No. 533,976
Int. Cl.² F15B *11/08, 13/042*
U.S. Cl. 91—420 **1 Claim**

1. Apparatus including a supporting frame, a member mounted on said frame for biased movement in one direction,

a hydraulic cylinder-piston assembly connected between said frame and said member and including a piston and a cylinder which houses said piston and includes opposed ends, a first fluid line extending from the one of said cylinder ends toward which said piston moves incident to movement of said member in said one direction, a second fluid line extending from the other of said cylinder ends, a source of pressure fluid, a control valve operatively connected to said source of pressure fluid and to said first and second fluid lines and including selectively operable means for supplying fluid to said one cylinder end and draining fluid from said other cylinder end and for supplying fluid to said other cylinder end and draining fluid from said one cylinder end, a first safety valve in said first fluid line responsive to pressure less than atomspheric and comprising a first body including therein a first main bore, and a cross bore extending transversely of and communicating with said first main bore, a first valve member movable in said cross bore between a position blocking said first main bore and a position permitting flow through said first main bore, said valve member including a face against which pressure can be applied to displace said valve member relative to said positions, means biasing said first valve member toward said flow permitting position, and first hydraulic means operatively



connected to said first valve member for displacing said first valve member from said flow permitting position against the action of said means biasing said first valve member and including a first conduit communicating with said valve member face and with said other cylinder end for transmitting said pressure less than atmospheric, and a second safety valve responsive to pressure greater than atmospheric in said first fluid line and comprising a second body including therein a second main bore having therein a restriction, a duct in said second body communicating with said second main bore in by-passing relation to said restriction and including therein a valve seat, a second valve member movable relative to a position in engagement with said valve seat so as to close said duct, said second valve member including a face against which pressure can be applied to displace said second valve member relative to said duct closing position, means biasing said second valve member toward said duct closing position, and second hydraulic means operatively connected to said second valve member for displacing said second valve member from said duct closing position against the action of said means biasing said second valve member and including a second conduit communicating said second valve member face with said other cylinder end.

4,018,137

PISTON MACHINE CONSTRUCTION

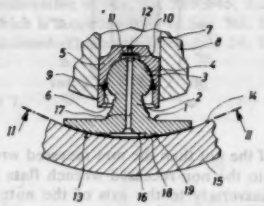
Hans-Jürgen Fricke, Stuttgart; Gerhard Nonnenmacher, Korntal; Walter Robeller, Boblingen, and Günter Kersten, Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Division of Ser. No. 432,742, Jan. 11, 1974, Pat. No. 3,948,149. This application Sept. 4, 1975, Ser. No. 610,402

Claims priority, application Germany, Feb. 17, 1973, 2307997

Int. Cl.² F01B *13/06*

U.S. Cl. 91—488 **9 Claims**



1. In a radial piston machine of the type having a housing, a reciprocable piston in said housing and having an axial end portion, and a piston-reciprocatng element having a glide surface located opposite said end portion with one of said elements and piston being movable relative to the other in a manner resulting in the reciprocation of said piston, a combination comprising a glide shoe articulately connected to said end portion of said piston and having a glide face in gliding contact with said glide surface, said glide face being of substantially rectangular outline and having two spaced longitudinal edges and two spaced transverse edges which extend from one to the other of said longitudinal edges, said glide face being formed with a polygonal recess which communicates via a passage with a source of pressure fluid, a sealing rim of substantially constant width surrounding said recess, and a plurality of face portions which are located outwardly of said sealing rim and configurated so that hydrodynamic pressure fields develop between said face portions and the respectively juxtaposed surface portions of said glide surface, said glide face being further provided with a pair of additional recesses each extending from one of said transverse edges inwardly towards said recess, and said glide face having two strip-shaped wider surface portions each extending along the entire length of one of said longitudinal edges, and two strip-shaped narrower surface portions each extending from one to the other of said wider surface portions intermediate said recess and one of said additional recesses, said rim being constituted by said narrower surface portions and by parts of said wider surface portions.

4,018,138

RADIAL PISTON PUMP/MOTORS

Rollin Douglas Rumsey, 138 Summer St., Buffalo, N.Y. 14222

Division of Ser. No. 108,089, Jan. 20, 1971, Pat. No. 3,935,794. This application Sept. 22, 1975, Ser. No. 615,405

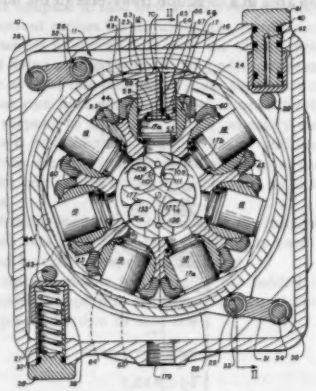
Int. Cl.² F01B *13/06*

U.S. Cl. 91—488 **15 Claims**

1. In a pump or motor assembly including a housing providing a chamber having therein hydraulically driven and driving members provided with telescoped slidably relatively rotative surfaces whereby one of the members supports the other member for relative running rotation, the members being liable to be affected by off-center forces tending to shift the members eccentrically during rotation, and one of said members having passage means for hydraulic pressure fluid during said running rotation:

hydraulic bearing means between said surfaces at substantially opposite sides of the axis of rotation of said surfaces;

means effecting hydraulic pressure fluid communication between said passage means and said bearing means; and valve means for controlling distribution of hydraulic pressure fluid from said passage means through said communication means to said bearing means to counteract the off-center forces which act to relatively shift said members eccentrically and thereby restrict the bearing means



at one side of said axis relative to the bearing means at the other side of said axis;

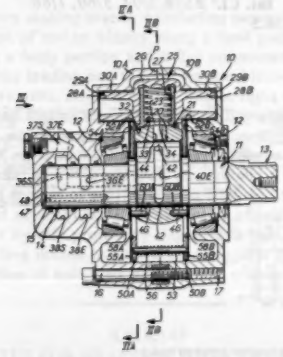
said valve means operating to increase the flow of hydraulic pressure fluid to the bearing means at the restricted side and to substantially proportionately decrease the flow of hydraulic pressure fluid to the bearing means at said other side, whereby to maintain substantially running rotation of the members.

4,018,139

ROTARY HYDRAULIC MACHINE

Jean Florent François Marcel Robert Landreau, Auzay, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed July 29, 1975, Ser. No. 600,183
Claims priority, application France, Aug. 8, 1974, 74.27514
Int. Cl.² F01B *13/06*
U.S. Cl. 91—490 **16 Claims**



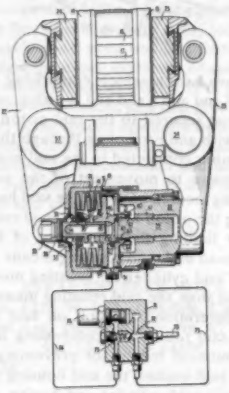
1. A rotary hydraulic machine comprising a casing, a shaft mounted for rotation in said casing, said shaft having an eccentric bearing surface intermediate its ends, a plurality of cylinder-piston assembly units disposed radially of and spaced around and exerting radial thrust toward said bearing surface, means individually oscillatingly mounting each of said assembly units on said casing about an axis substantially parallel to said shaft so that the cylinders and pistons of the cylinder-piston assembly units reciprocate relative to each other in a predetermined order upon rotation of said shaft, inlet and outlet passageways disposed in said shaft parallel to the axis thereof for circulating hydraulic fluid through said machine, angularly spaced inlet and outlet cavities in said shaft in communication with said inlet and outlet passageways respectively and opening onto said bearing surface, protruding change-over zones formed on said bearing surface effectively separating said inlet and outlet cavities from each other, and a distribution ring received on said bearing surface cooperating with said change-over zones and disposed between said bearing surface and said cylinder-piston assembly units, said distribution ring having a plurality of generally radial passages each facing and communicating with one of said cylinder-piston assembly units and also communicating alternately with said inlet and outlet cavities, and means permitting eccentric circular movement of said distribution ring while preventing its rotation with said bearing surface on said shaft comprising at least one annular plate arranged around said shaft and adjacent to said distribution ring member, there being a plurality of arcuate guiding openings in said annular plate and a corresponding plurality of guiding pin means in contact therewith, said pin means being fixed relative to one of said casing and distribution ring.

4,018,140

HYDRAULIC DISC BRAKE ACTUATOR

Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed June 17, 1974, Ser. No. 480,439
Int. Cl.² F01B *3/00*
U.S. Cl. 92—31 **3 Claims**



1. An improved brake actuator comprising:

a fluid pressure motor having a reciprocating piston member for effecting brake applications;

spring motor means normally restrained by said fluid pressure motor for urging said piston to effect said applications in response to a reduction in pressure in said fluid pressure motor;

threaded means for threadably engaging said piston member along its axis of reciprocation, said threaded means establishing a frictional resistance with said piston means and including means for selectively, manually rotating said threaded means in a first direction to retract said piston member and compress said spring motor means following brake application by said spring motor or in a second direction to extend said piston member under the action of said spring motor means to effect a brake appli-

cation without repressurization of said fluid pressure motor; and

resilient torque means engaging said threaded means and being wound during rotation in said first direction to produce a torque initially insufficient to overcome said frictional resistance when said pressure released motor is depressurized but adequate for automatically rotating said threaded means in said second direction when said pressure released motor has been pressurized to compress said spring motor means and to reduce the frictional force between said piston and said threaded means sufficiently to thereby allow said threaded means to rotate under the influence of said resilient means.

4,018,141

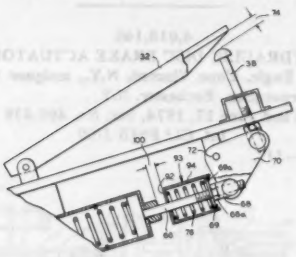
VEHICLE SPEED CONTROL

Ralph M. Duttarer, St. Joseph, and Richard R. Hushower, Buchanan, both of Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Division of Ser. No. 488,336, July 15, 1974, Pat. No. 3,954,152. This application Aug. 11, 1975, Ser. No. 603,409

Int. Cl.² F01B *11/02*

U.S. Cl. 92—85 A **6 Claims**



1. A control device for a vehicle comprising a hollow cylinder having a head end and a rod end, a piston reciprocal in the said cylinder, a rod secured to the said piston for reciprocal movement therewith and projecting through the said rod end, an abutment member connected to the said rod for reciprocal movement responsive to movement of the said rod, a first compression spring located between the said head end and the said piston urging the piston toward the said rod end, a stop in the said cylinder limiting the movement of the said piston toward the said head end, and resisting means carried by said rod externally of said cylinder for resisting movement of said piston toward said stop, the said resisting means comprising a washer at a predetermined location on said rod, a housing surrounding the said rod and encompassing the said washer and including abutment means for preventing separation of said housing and said washer, the said housing extending from said washer toward said cylinder and having an end portion adjacent the cylinder, and a second compression spring located internally of said housing between said washer and said end portion.

4,018,142

BOX-BAG WITH PERMANENTLY SECURED HANDLE

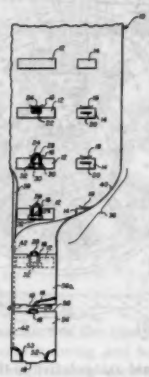
Leonard E. Canno, New York, N.Y., assignor to Equitable Bag Co., Inc., Long Island City, N.Y.

Filed Apr. 19, 1976, Ser. No. 677,896

Int. Cl.² B31B *1/86*, *49/04*

U.S. Cl. 93—35 H **11 Claims**

1. The method of making a container with a bag-like lower end portion and a top portion that is constructed with features of a flat box, including advancing a web in the direction of its length, making successive transverse cuts through the web at locations that correspond to a mid-region of the top of successive container blanks that are made from the web, securing reinforcing sheets to the web over areas that will form the top portion at the front and rear of each container blank, cutting away at least a part of the front top panelarea for a distance extending down from the upper end of the container blank and of a width greater than the width of a handle that is to be applied to the upper part of the front of the container, forming a slot through the reinforcing sheet of the rearward top area in a direction transverse of the length of the



web and at a distance below the top of the container blank approximately equal to the depth of the cut-away part of the front top panel area, applying a handle to the front top panel area with the handle permanently connected to said front top panel area at a location below the level of the cut-away part, folding the web lengthwise to form container blanks, and severing successive blanks from the folded web at the top end of the rear top panel area.

4,018,143

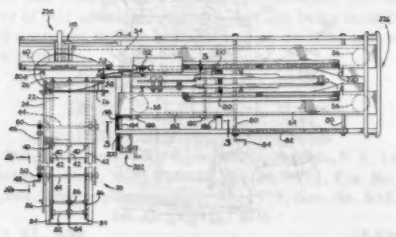
CARDBOARD BOX ERECTING MACHINE

S. Virgil Dice, Jr., Rowland Heights, and Harry R. Lobdell, Rolling Hills Estate, both of Calif., assignors to Cal Crown Corporation, Los Angeles, Calif.

Filed May 2, 1975, Ser. No. 573,895

Int. Cl.² B31B *5/02*, *5/60*, *1/80*

U.S. Cl. 93—36.3 **2 Claims**



1. A case erector comprising:

a transport means for transporting boxes through said case erector;

a magazine means for holding a plurality of folded boxes;

a pull-out station means for sequentially removing individual folded boxes from said magazine means and disposing said boxes so as to be received by said transport means;

a set-up station means for sequentially receiving folded boxes from said transport means and opening said boxes;

first folding means, located at said set-up station, for folding the lateral flaps on the bottom of each box, said first folding means comprising (a) first and second members, (b) actuating means for moving each of said first and second members from a first lower position through a path of travel generally upward and toward each other to intercept and fold the lateral flaps on a box, (c) support means coupled to said first and second members, and (d) adjustment means for adjusting the position of said support means in accordance with the characteristics of the boxes being erected wherein said adjustment means comprises at least one lead screw, said support means having at least one lead screw follower cooperatively disposed with respect to said lead screw whereby said support means is positioned by the rotation of said lead screw;

application means for applying adhesive to at least one flat of each box as said boxes are advanced by said transport means;

second folding means for encouraging the longitudinal flaps of each box into the folded position as each box is advanced by said transport means; and

a press-station means for pressing the folded lateral and longitudinal flaps into firm face to face abutment to secure good adhesion of said flaps.

4,018,144

FLAP FOLDING MECHANISM FOR CARTON MAKING MACHINES

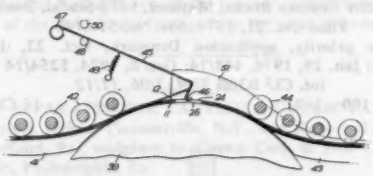
Colin Stutt, Bristol; Anthony John Noble, Skipton, and Reginald Arthur Ford, Bristol, all of England, assignors to Masson Scott Thrissell Engineering Limited, Bristol, England

Filed July 25, 1975, Ser. No. 599,252

Claims priority, application United Kingdom, Aug. 2, 1974, 34123/74

Int. Cl.² B31B *1/52*

U.S. Cl. 93—52 **12 Claims**



1. A carton making machine including means for conveying a succession of carton blanks along a feed path, each blank comprising a body portion and a flap connected to said body portion at the leading end thereof, as considered in the direction of movement, along a crease line at right angles to said direction, and folding means to fold said flap about said crease line, wherein said feed path is of convex configuration, in the direction of movement of said blanks, along a section of its length, so that said flap projects tangentially to the curve of said convex section of said feed path, and said folding means is positioned adjacent said convex section of said feed path for engagement by said projecting flap so that said flap is folded by said folding means as said carton blank is fed along said convex section of said feed path by said conveying means.

4,018,145

APPARATUS FOR DRAINING WHEY FROM CHEESE

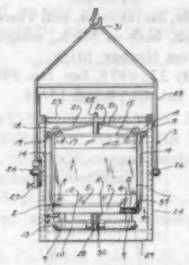
Otis O. Hensel, P.O. Box 185, Hustisford, Wis. 53084

Filed Aug. 19, 1974, Ser. No. 498,512

Int. Cl.² A01J *11/06*; B30B *9/06*; B01D *39/10*

U.S. Cl. 99—458 **3 Claims**

1. An apparatus for draining whey from cheese curd, comrising an open ended container to contain the cheese curd, said container having a generally rectangular cross section, a frame to support the container and including a base, a support plate mounted on the base and enclosing the lower end of said container, a removable lid to enclose the open top of the container and having a series of openings therein, a cradle including a first cradle member and a second cradle member to support the frame, first journaling means for journaling the base of the frame with respect to the second cradle member, second journaling means for journaling the lid with respect to the second cradle member, said first and second journaling means being arranged to permit rotation of said frame and said container, means pivotally connecting the second cradle means to the first cradle member for moving the frame and the container from a generally upright position to an inclined position, said support plate having a series of downwardly extending grooves, said grooves having a generally V-shaped cross section and terminating at a relatively sharp lower edge



and having a greater depth than width, each groove having at least one open end disposed at the peripheral edge of the support plate, said support plate also being provided with a series of drain holes, the whey draining through said holes and along said grooves and being discharged through said open ends, at least a first of said grooves being located along a side extremity of said support plate and said first groove terminating in a side edge, the upper extremity of said side edge being at a lower level than the upper extremity of the portion of the support plate located adjacent said first groove, the lower end of the container being spaced upwardly from said side edge to provide a clearance therebetween, and a plastic liner disposed on the inner surface of the container and having a lower end doubled back over the lower open end of the container and disposed within said clearance.

4,018,146

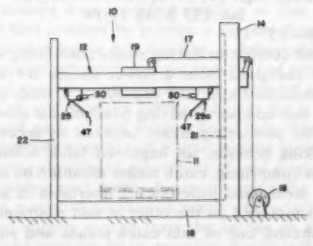
STRAP SNUBBER HORN

Elferd L. Evans, 1235 W. I St., Oakdale, Calif. 95361

Filed Apr. 16, 1976, Ser. No. 677,688

Int. Cl.² B65B *13/04*

U.S. Cl. 100—26 **11 Claims**



1. In a strapping machine for affixing a tautened strap under, up the sides of and across the top of a load, said machine having a vertically movable platform and a strapping head carried by said platform, said strapping head being operable to

tauten the straps around the load and clamp the ends of the tautened strap together, the improvement comprising:

a. a pair of probes mounted on said platform on opposite sides of said strapping head and positioned to intercept said strap during initial strapping operation;

b. means for positioning said probes adjacent opposed upper edges of said load;

c. means for holding said probes against movement relative to said platform when said probes are positioned adjacent said opposed upper edges of said load; and

d. means for removing said probes from between said strap and said load after tautening and clamping of said strap.

4,018,147

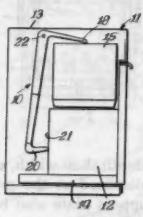
REFUSE COMPACTOR WITH AUTOMATIC DRAWER OPENER

Roque Denis Marcade, Stevensville, and Vincent Paulraj Gurubatham, St. Joseph, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed July 22, 1975, Ser. No. 598,050

Int. Cl.² B30B *15/14*

U.S. Cl. 100—45 **11 Claims**



1. In a refuse compactor having a receptacle for receiving refuse to be compacted, means for movably mounting the receptacle for selective manual positioning in a compacting position and an exposed refuse-receiving position, a ram, and powered means for selectively moving the ram in a compacting cycle from a retracted position into said receptacle in said compacting position for compacting refuse in the receptacle, said powered means returning the ram to the retracted position with the receptacle retained in the compacting position upon completion of the compacting cycle, the improvement comprising means for selectively causing an operation of said powered means in an opening cycle to cause said receptacle to move from said compacting position toward said exposed position.

4,018,148

LATCH FOR TRASH COMPACTORS

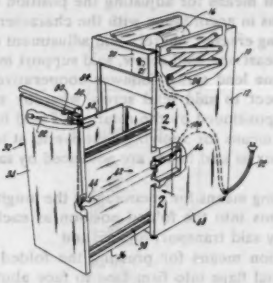
David W. Wolbrink, Hartford, Wis., assignor to Broan Manufacturing Co., Inc., Hartford, Wis.

Filed Sept. 16, 1975, Ser. No. 613,923

Int. Cl.² B30B *15/14*

U.S. Cl. 100—53 **7 Claims**

1. In a trash compactor having means positioning a compaction means energized from a power source for movement along a compaction axis into and out of a trash containing receptacle, said compactor having panel means movable with respect to the positioning means between an access position and a blocking position, an improved latch means for the panel means comprising: catch means mounted on one of said positioning means and panel means insertable in an engagement means mounted on the other of said positioning means and panel means, one of said catch means and engagement means being mounted at a pivot point for pivotal movement about an axis perpendicular to the direction of insertion of said catch means into said engagement means, said catch means having a portion extending along the direction of insertion and containing a notch having a surface normal to the direction of insertion; said engagement means having a bar engagable with said extension portion and insertable in said notch in abutment with the normal surface by the pivotal movement of one of said catch means or engagement means upon insertion of said catch means in said engagement means for restraining said catch means from removal from said engagement means for locking said panel means in the blocking position, the location of the abutting surface and bar being



displaced from said pivot point in a direction normal to the direction of insertion such that forces tending to move the panel means to the access position tend to pivot the movable element into the engaged condition, said engagement means including switch means interposed between said compaction means and said power source and operable by the movement of said catch means to the restrained state for rendering said compaction means operable.

4,018,149

PRESS FOR PRODUCTION OF A DRY FODDER

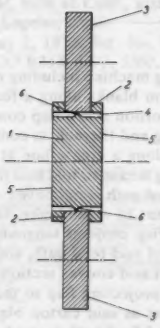
Bjorn Adler Zeuthen Bruun, Majlund, 9870 Sindal, Denmark

Filed Oct. 21, 1974, Ser. No. 516,741

Claims priority, application Denmark, Oct. 22, 1973, 5726/73; Jan. 29, 1974, 448/74; Oct. 8, 1974, 5254/74

Int. Cl.² B30B *3/04, 3/06, 11/12*

U.S. Cl. 100—160 **16 Claims**

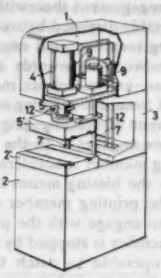


1. A press for compressing vegetable material beyond the yielding point to produce dry fodder, comprising a cylindrical matrix having at least one radially extending flange with a wall extending at right angles to a rotational axis of said matrix and defining an annular circumferential stepped portion adjacent said wall having a smaller diameter than said flange and rotatable pressing means rotatable about an axis parallel to the axis of said matrix and pressing said matrix in said stepped portion, said matrix having axially extending cutouts connecting an axially extending cylindrical surface of said stepped portion to at least the side of said matrix containing said flange and having a length greater than the thickness of said flange.

4,018,150
OPEN-SIDED PRESS

Seiji Shiokawa, 110-6 Matsumoto, Mishima, Shizuoka, Japan

Filed June 11, 1975, Ser. No. 585,803
Int. Cl.² B30B 1/32
U.S. Cl. 100—231 3 Claims

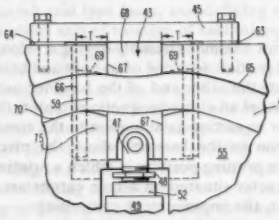


1. In an open-sided press which comprises an upper frame having a rear and a forward end, a main cylinder at the forward end, a lower frame having a rear end, the lower frame being opposed to said upper frame across a vertical spacing, and a shank frame attached integrally to the rear ends of said upper and lower frames so as to provide support therefor, the press being adapted to produce pressure by hydraulically actuating said main cylinder, the improvement wherein said open-sided press further comprises a corrective mechanism having an auxiliary cylinder means including at least one auxiliary cylinder disposed parallel to the main cylinder of the upper frame between said main cylinder and the shank frame, a rod projected from the forward end of each auxiliary cylinder and forming a tension bar fastened onto the lowerframe, and flow path means adapted to deliver the hydraulic actuating fluid to the auxiliary cylinder means in a direction opposite that of the fluid in the flow path to the main cylinder.

4,018,151
APPARATUS FOR VARYING A CYCLIC PATH

Joseph J. Urban, Pleasantville, N.Y., and Robert H. Hoenes, Holland, Pa., assignors to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Filed Dec. 8, 1975, Ser. No. 638,644
Int. Cl.² B41F 17/22
U.S. Cl. 101—40 8 Claims



1. Apparatus for transporting a series of cylindrical containers past a printer station to allow a coating to be deposited upon the containers, comprising:

a carrier for conveying containers including a plurality of mandrels for engaging ones of the containers, a plurality of support means movably locating said mandrels on said carrier, and a plurality of followers each carried by ones of said support means;

a cam assembly defining an endless groove of substantially constant width for engaging said followers to cause said mandrels to follow a predetermined path, said groove comprising inner and outer side walls and being interrupted by a generally transverse slot having a T-shaped cross-section to form a T-slot, the opposed side walls of reduced height intercepted by the lateral segments of the T-slot diverging by a distance *d* to broaden the groove and form a pair of transition zones;

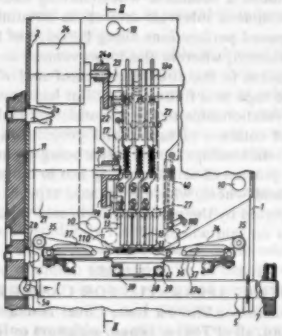
a movable portion having a T-shaped cross-section and slidably received in said T-shaped slot, the center segment of said T-shaped portion defining upstanding side walls of a height generally the same as the height of said groove, the edge segments at either side of the movable portion defining side walls of a height substantially less than the depth of said groove and overlying the opposed side walls of reduced height, the side walls defined by the edge segments of said movable portion diverging by said distance *d*; and

means coupled to said movable portion for controllably displacing said movable portion by said distance *d*.

4,018,152
APPARATUS FOR APPLYING INDICA ON PHOTOGRAPHIC PAPER OR THE LIKE

Gunter Heidrich, Munich, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 18, 1975, Ser. No. 614,634
Claims priority, application Germany, Sept. 21, 1974, 2445279
Int. Cl.² B41J 3/54, 7/48, 29/38
U.S. Cl. 101—45 17 Claims



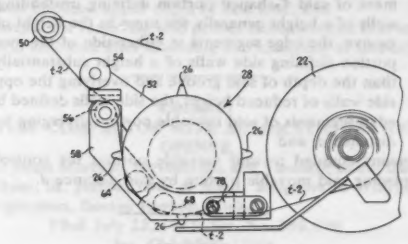
1. Apparatus for applying indicia to carriers of information, particularly for applying colored impressions, to rear sides of webs of the type having a layer of photosensitive material at the front side thereof, comprising a frame; a housing mounted in and movable up and down relative to said frame; means for moving said housing to a raised first position; means for releasing said housing from said first position so that it descends from said first position by gravity; a support for information carriers located below said housing, a deformable source of coloring matter intermediate said housing and said support; a plurality of modules vertically movably mounted in said housing, each of said modules having a holder for a plurality of symbols and each of said holders being indexible to move a selected symbol opposite said source; biasing means for yieldably opposing downward movement of said modules relative to said housing; and means for intercepting the descending housing in a second position in which said selected symbols are at least slightly spaced from the carrier on said support whereby said modules begin to move downwardly by inertia relative to said housing and against the opposition of said biasing means and said selected symbols press said source against the carrier on said support so that the source applies to the carrier indicia constituting reproductions of selected symbols.

4,018,153

TAPE HANDLING APPARATUS UTILIZING TANGENTIAL WEB CONTACT FOR POSTAGE METER

Gerald C. Freeman, Darien, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed May 16, 1975, Ser. No. 578,121
Int. Cl.² B41F *1/08*
U.S. Cl. 101—93 **3 Claims**



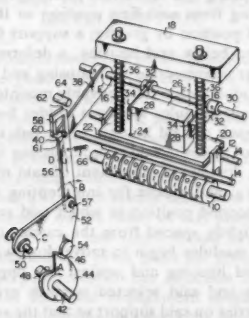
1. In an apparatus for advancing a multi-layered tape having a plurality of spaced perforations along an edge thereof through a predetermined distance said apparatus being of the type wherein said tape is advanced along a support means by a drive means, and a control means initiates the operation of said drive means to advance said tape and deactivates the operation of said drive means after said tape has advanced through a predetermined distance, and wherein said control means includes a rotatable wheel having radial projections disposed at spaced intervals around its circumference to engage the spaced perforations along the edge of the tape as the tape is advanced, wherein the improvement comprises guide means adjacent to the circumference of said wheel for maintaining said tape in a finite series of at least two substantially tangential relationships to the circumference of said wheel in the path of rotation of said radial projections, each of said tangential relationships in said series being separated from any other by a portion of said tape strip not in tangential relationship with said wheel, whereby as said tape is advanced said wheel is rotated by the perforations in said tape engaging said projections on said wheel.

4,018,154

PRINTING APPARATUS FOR CASH REGISTER

Jyusei Matsumoto; Minoru Itoh; Chuzi Ishikawa, and Yoshio Hashimoto, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Feb. 11, 1975, Ser. No. 549,118
Claims priority, application Japan, Feb. 14, 1974, 49-17104
Int. Cl.² B41J *9/02*
U.S. Cl. 101—93.02 **6 Claims**



1. Printing apparatus comprising, in combination:

a printing member engageable with a printing medium to perform printing;

a mechanism for moving the printing member into and out of engagement with the printing medium, the mechanism including biasing means to resiliently urge the printing member to engage with the printing medium in a manner causing the printing member to rebound from the printing medium after engagement therewith, an engaging member being releasably disposed between the biasing means and the printing member, said engaging member being mounted for movement towards and away from said printing member, and a stopper member disposed in a position spaced from said printing member and arranged to stop movement of the engaging member before the printing member engages with the printing medium so that the printing member is accelerated toward the printing medium by the biasing means through the engaging member and the printing member continues movement due to inertia to engage with the printing medium after the engaging member is stopped by the stopper member;

catching means operable to catch the printing member upon rebound from the printing medium and hold the printing member between a position in contact with the printing medium and a position in contact with the engaging member;

release means engageable with the mechanism and catching means to release and reset the catching means; and

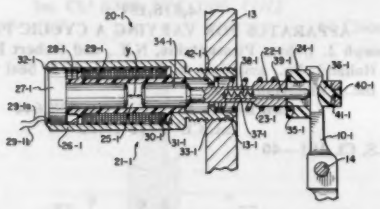
a motor driven cam shaft carrying a cam, said cam being operably connected to said mechanism for initiating actuation of said mechanism, whereby rotation of said cam causes said mechanism to effect said movement of said printing member into engagement with the printing medium.

4,018,155

BALLISTIC PRINT HAMMER ASSEMBLY

N. Allen Cargill, Warminster, Pa., assignor to Mohawk Data Sciences Corporation, Herkimer, N.Y.

Filed June 2, 1975, Ser. No. 583,010
Int. Cl.² B41J *9/30*
U.S. Cl. 101—93.33 **8 Claims**



1. In a print hammer assembly having an elongated hammer with a head portion near one of its ends and being mounted on a rigid pivot, the other end of the hammer being coupled to the armature of an electromagnetic actuator, the actuation of the actuator imparting axial motion to the armature and rotational motion to the hammer about the pivot from a rest position to a printing position in which a printing medium and a type character situated on a type carrier are impacted into engagement, the improvement comprising:

said electromagnetic actuator including said armature and a stator having a generally cylindrical cavity which has a bottom and a mouth, said armature being elongated and partially disposed within said cavity so that a portion thereof extends outside the cavity mouth, an elongated slot extending through said portion, said slot having first and second ends, and a central armature cavity having a bottom and a mouth which opens into the first end of the armature slot;

the other end of the hammer extending through said slot and being adapted for motion within the slot between its first and second ends;

impression control spring means located within said armature cavity and arranged to continually urge said hammer toward the second end of the slot; and

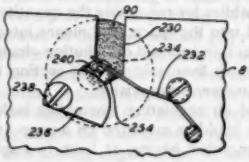
means for actuating the stator to produce said axial and rotational motions of the armature and hammer, said armature bottoming against the stator cavity bottom prior to the hammer head portion reaching the printing position such that the hammer continues to rotate due to its rotational inertia toward the printing position in a free-flight condition, the duration of which is a function of the thickness of the print medium, the impression control spring means continually acting upon the other end of the hammer to decelerate the hammer during the free-flight condition so that the rotational hammer velocity is relatively higher for a thick print medium than for a thin print medium.

4,018,156

DOCUMENT IMPRINTER

Benjamin B. Giordano, Tenafly, N.J., assignor to Litton Business Systems, Inc., Belleville, N.J.

Filed Nov. 11, 1974, Ser. No. 522,958
Int. Cl.² B41F *31/00*
U.S. Cl. 101—106 **3 Claims**



1. In a document imprinter having a frame on which are mounted: printing means for printing information on documents, said printing means comprising a rotary printing unit including type faces to be inked to print said information on said documents; an inking roller mounted for rotation about a longitudinal axis of rotation and cooperable with said rotary printing unit to ink said type faces; axis-defining means defining said longitudinal axis of rotation of said inking roller, said axis-defining means being movably adjustable in a direction transverse to said longitudinal axis; means for adjusting in said transverse direction the position of said axis-defining means, and therefore of said longitudinal axis of rotation and said inking roller; said adjusting means comprising:

a plurality of individual, discrete locating surfaces each corresponding to a different transversely shifted position of said axis-defining means;

said locating surfaces defining in cross section a rectangle;

said axis of rotation of said inking roller intersecting said rectangle at a point which is eccentric relative to the center of said rectangle;

a reference surface means;

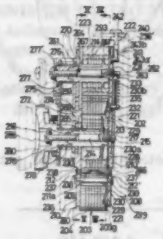
any selected one of said locating surfaces being selectively engageable with said reference surface means, each of said locating surfaces when engaged with said reference surface means being effective to cause said axis-defining means, and therefore said longitudinal axis of rotation and said inking roller, to be held in a different transversely shifted position, each such shifted position corresponding to a different one of said locating surfaces.

4,018,157

PRINTING HEAD FOR PRINTING BAR CODE CHARACTERS

Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Apr. 21, 1976, Ser. No. 678,761
Claims priority, application Japan, Apr. 26, 1975, 50-50221; Sept. 11, 1975, 50-109474
Int. Cl.² B41J *1/60*
U.S. Cl. 101—110 **22 Claims**



1. A printing head, which is mountable on a printing machine for selecting and printing indicia on labels, or the like, said printing head comprising:

a plurality of type rings; each said type ring having a periphery and having a plurality of sides around its periphery; each said type ring side carrying a respective printable indicium;

a common rotation support for all said type rings, around which each said type ring is rotatable independently of the other said type rings;

type ring pressing means engageable with said type rings to press said type rings into contact together, thereby eliminating clearance spaces between adjacent said type rings such that an individual said type ring is prohibited from rotation independently of the other said type rings; said type ring pressing means being positionable in a second manner with respect to said type rings so as to stop pressing said type rings together to permit clearance spaces to develop between said type rings, such that said type rings may be independently rotated;

type selector means movable with respect to said type rings along said common support to be in engagement with a selected said type ring, and when said type selector means is in engagement with a said type ring, said type selector means being movable to rotate that said type ring.

4,018,158

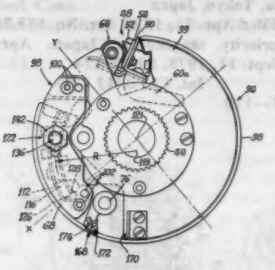
UNIVERSAL MASTER CYLINDER FOR OFFSET PRESSES

Lawrence A. Borneman, Lombard, Ill., assignor to A. B. Dick Company, Chicago, Ill.

Filed Dec. 29, 1975, Ser. No. 644,931
Int. Cl.² B41F *1/28*
U.S. Cl. 101—132.5 **17 Claims**

1. A master cylinder assembly for an offset or the like printing press including in combination: a hollow cylindrical member having a stationary master receiving surface of a predetermined length extending less than 360° about the periphery thereof, lead and trailing end master sheet holding means at opposite ends of said master receiving surface, one of said holding means mounted for movement between a first position adjacent a first end of said master receiving surface for accommodating a master sheet of a first predetermined length and a second position internally of said cylinder member away from said first end of said master receiving surface, and an arcuate master receiving cylinder surface extension section mounted for movement between a first position internally of said cylinder when said one holding means is in said first position, and a second position in engagement with said first end of said stationary master receiving surface when said one holding

means is in said second position for providing an extension of said master sheet receiving surface to accommodate a master



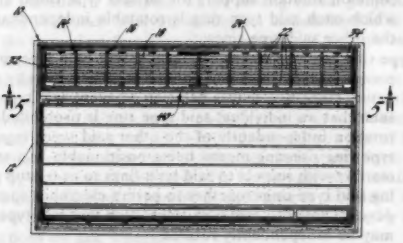
sheet of a second predetermined length, greater than said first predetermined length.

4,018,159

AIR FLOW GUIDE MECHANISM

George Thomas Bennett, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 4, 1975, Ser. No. 610,405
Int. Cl.² F24F *13/10*
U.S. Cl. 98—40 VM **2 Claims**



1. Air flow guide mechanism for guiding air flowing through an opening having top and bottom walls and end walls, said opening being adapted to deliver air flow into an enclosure commonly having one or more human occupants, said mechanism comprising:

a first louver array having first rack means pivotally mounted in said opening on a horizontal axis for pivotal movement in vertical planes and including a plurality of horizontally extending louvers,

a second louver array mounted in said opening adjacent said first louver array in series air flow relation therewith and having a plurality of vertically extending louvers each pivotally mounted on a vertical axis for pivotal movement in horizontal planes,

actuating rack means attached to said vertically extending louvers and movable to cause said vertically extending louvers to pivot about their vertical axes,

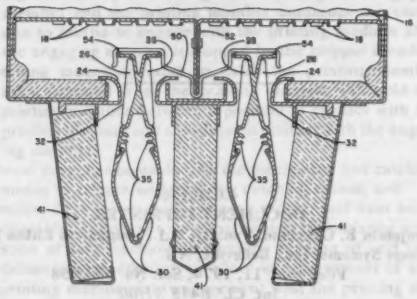
a motor driven rotatable cam mounted on one of said rack means and having a first cam follower fixed to one of said opening walls and selectively engaging said cam whereby when said cam is rotated and said first cam follower is engaged in cam following relation with said cam, said cam and said first cam follower coact to cause said cam and said one of said rack means to pivotally oscillate the louvers associated therewith and cause a sweeping action of air flow in a first plane, said cam having a second cam follower attached to the other of said rack means whereby when said cam is rotated said cam and said second cam follower coact to drive the other of said rack means to cause pivotal oscillation of the louvers associated therewith and cause a sweeping action of air flow in another plane at substantially right angles to said first plane, said sweeping action combining to give a combination horizontal and vertical air flow sweep.

4,018,160

AIR CONDITIONING TERMINAL

Kenneth K. Cunningham, N. Syracuse, and Carl C. Herb, Camillus, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed June 10, 1975, Ser. No. 585,560
Int. Cl.² F24F *13/08*
U.S. Cl. 98—40 D **1 Claim**



1. In an air conditioning terminal for supplying conditioned air into a space and including a plenum section connected to a source of conditioned air and a distribution chamber having a pair of assemblies for regulating the quantity of conditioned air discharged into the space, and means interposed between said plenum section and said distribution chamber for passage of conditioned air from said plenum section into said chamber, the improvement comprising:

each of said air regulating assemblies including a pair of inflatable bladders mounted on a support member, each support member having at least two spaced apart upstanding arms; and

a restraining member formed from spring-like material and connected to a non-movable portion of said terminal and to the outer surface of each upstanding arm of said support members to provide opposed horizontal forces on said upstanding arms to prevent relative movement in any direction in at least one plane between said air regulating assemblies and said non-movable portion whereby generation of noise by the relative movement of said assemblies is prevented.

4,018,161

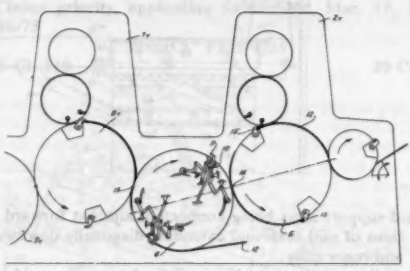
PRINTING MACHINE WITH SHEET-TRANSFER ARRANGEMENT

Hans Johne, Redebeul; Arndt Jentzsch, Coswig, and Otfried Rudolph, Dresden, all of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Mar. 25, 1975, Ser. No. 561,676
Int. Cl.² B41F *21/00*
U.S. Cl. 101—231 **4 Claims**

1. In a printing machine, a combination comprising a first printing station having a first printing roller for printing one side of a sheet which travels with the same; a second printing station having a second printing roller for printing the other side of the same sheet; a sheet transfer roller located between and cooperating with said first and second printing rollers; suction gripper means on said transfer roller for lifting a trailing edge portion of the sheet off said first printing roller; means for temporarily advancing said suction gripper means

relative to said transfer roller circumferentially of the same and in the direction of rotation thereof along a arcuate path, so as to cause the trailing edge region of the sheet to bulge away from said first printing roller, said advancing means comprising a rocker linkage including a first link member having a free end and another end pivoted at a first location inwardly of the periphery of said transfer roller, a larger second link member also having a free end and another end which is pivoted at a second location inwardly of the periphery of said transfer roller and radially and circumferentially offset from said first location, and a third link member having spaced ends each of which is pivoted to one of said free ends of said first and second link members, said suction gripper means being mounted on said third link member, cam means turnable with said transfer roller and having respective portions which are spaced radially and circumferentially of said transfer roller, and cam follower means operatively associated with said first and second link members and cooperating with the respective cam portions for imparting to each of said first and second link members a part-circular pivoting movement about the respective location, so that said suction gripper means on said third link member moves with said second and third link means relative to said transfer roller in a first curved path in the direction of rotation of the same and also moves relative to said second and third link means in a second curved path, and mechanical gripper means on said transfer roller and operative for receiving said trailing edge portion of said sheet from said suction gripper means prior to disengagement of the latter from said trailing edge portion, and for pulling the sheet after such disengagement off the first printing roller, turning it and presenting it to said second printing roller during continued rotation of said transfer roller.

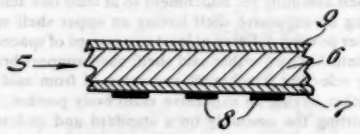


4,018,162

CONTINUOUS DUPLICATING SHEETS

Melvin Sharkey, 1614 Hereford Road, Hewlett, Long Island, N.Y. 11557, and Douglas A. Newman, Soundside Lane, Glen Cove, N.Y. 11542

Filed Aug. 10, 1973, Ser. No. 387,532
Int. Cl.² B41M *5/02*; B32B *33/00*
U.S. Cl. 101—473 **9 Claims**



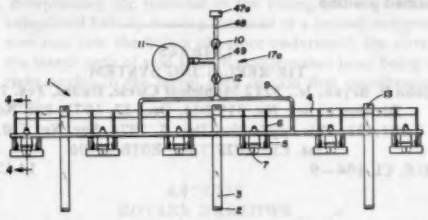
1. A pressure-duplicating master sheet comprising a paper foundation which normally is absorbent of liquid oils, an oil-barrier layer of synthetic thermoplastic resin on the working surface of said paper foundation, an image applied to said oil-barrier layer as a composition comprising a pressure-nontransferable microporous network of solid binder material containing within the pores thereof a pressure-exudable ink comprising coloring matter and a liquid oil vehicle which is inert with respect to the resin of said barrier layer, the opposite surface of the paper foundation being treated so as to be non-absorptive of said oil and inert with respect thereto, said image containing a sufficient amount of said pressure-exudable ink to produce a relatively large number of duplicate copies thereof under the effects of pressure.

4,018,163

PLACEMENT METHOD FOR Q.D. CHARGES USING MINIMUM DIVING TIME

Claude H. Brown, Arlington, Tex., assignor to Jet Research Center, Inc., Arlington, Tex.

Division of Ser. No. 522,542, Nov. 11, 1974, Pat. No. 3,972,285. This application Jan. 30, 1976, Ser. No. 653,985
Int. Cl.² F42D *1/00*
U.S. Cl. 102—23 **3 Claims**



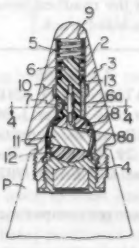
1. A method of detonating an array of explosive charges using a framework, which comprises the steps of:
   a. individually loading each of a plurality of explosive charges on a framework so as to form an array of the objects;
   b. placing said loaded framework at a given location;
   c. simultaneously releasing said array of explosive charges from said framework;
   d. recovering said framework; and
   e. thereafter detonating said explosive charges.

4,018,164

PROJECTILE FUZE CONTAINING A FLOATING BODY

David S. Breed, Boonton; Torbjorn Thuen, Roseland, and Allen K. Breed, Boonton, all of N.J., assignors to Breed Corporation, Fairfield, N.J.

Continuation of Ser. No. 395,962, Sept. 10, 1973, abandoned. This application June 12, 1975, Ser. No. 586,434
Int. Cl.² F42C *15/24*
U.S. Cl. 102—78 **15 Claims**



1. A fuze adapted to be fitted to one end of a munitions projectile, said fuze comprising an elongate housing member having an elongate cavity therein between its forward and rearward ends, arming means mounted in said housing member rearward of said elongated cavity and in communication therewith, and being movable between safe and armed positions; said cavity and said housing member having elongate axes coinciding substantially with one another; a fluid con-

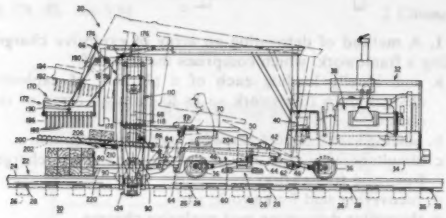
tained in and substantially filling said cavity; a body member accommodated in said cavity for free sliding movements fore and aft of said cavity and immersed in said fluid, said fluid having a specific gravity greater than the average specific gravity of said body member whereby said body member is buoyant; resilient means acting on said body member and being of such capacity as to overcome the buoyancy of said body member and bias the latter to a position at the rearward end of said cavity; fluid passage means between said members enabling sufficient fluid flow aft of said cavity in response to forward acceleration of said housing member to overcome the bias of said resilient means and displace said body member forwardly of said cavity; and releasable locking means mounted on said body member acting on said arming means to maintain the latter in its safe position when said body member is in a position at the rearward end of said cavity and responsive to forward displacement of said body member to release said arming means whereby the latter is enabled to move to its armed position.

4,018,165

TIE REPLACING SYSTEM

John F. Bryan, Jr., 3212 Mapleleaf Circle, Dallas, Tex. 75233

Division of Ser. No. 319,004, Dec. 27, 1972, Pat. No. 3,881,422. This application Dec. 5, 1974, Ser. No. 530,016
Int. Cl.² E02F *5/00;* **E01B** *29/06*
U.S. Cl. 104—9 **14 Claims**



1. A process for replacing worn ties from a railroad track of the type comprising longitudinally extending metal rails supported on transversely extending wooden ties by metal tie plates and a ballast roadbed supporting and at least partially surrounding the ties including the steps of:

applying a substantially axially directed force to a worn tie in the railroad track and thereby pushing the worn tie out from under the rails and the tie plates and out of the roadbed of the railroad track; and

simultaneously scarifying the portion of the roadbed immediately adjacent the position previously occupied by the worn tie and thereby facilitating the positioning of a replacement tie in the roadbed beneath the rails and the tie plates of the railroad track.

4,018,166

COMBINATION SEAT AND BERTH

Jack E. Gutridge, Dyer, and Walter J. Marulic, Gary, both of Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed Mar. 29, 1976, Ser. No. 671,237
Int. Cl.² B61D *1/02*
U.S. Cl. 105—316 **9 Claims**

1. A railway car passenger compartment including an outer side wall;

longitudinally spaced laterally extending partition walls, and a divider wall extending longitudinally in laterally spaced relation with respect to said outer wall, the improvement comprising a convertible seating arrangement including;

a seat back, adjacent each of said partitions,

a seat disposed below each seat back;

means slidingly supporting each said seat back on each said partition wall for movement from an upright position to a lowered horizontal position,

means hingedly connecting said seat backs to each said seat,

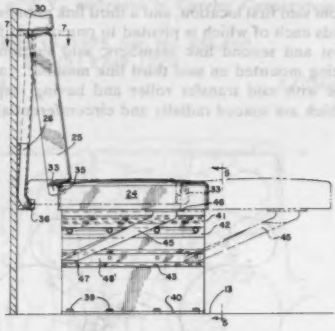
a seat support pedestal vertically and longitudinally supported within said compartment below each said seat,

first upper and lower horizontal tracks mounted on said pedestals,

upper second tracks supported on said outer side wall,

upper slide brackets on said seats slidingly supported on said first and second upper tracks,

a support arm for each seat,



said support arms being connected adjacent forward portions of said seats and extending diagonally downwardly and rearwardly,

and slide means on said arms slidingly engaging said lower track,

whereby in the horizontal position of said backs and seats, said seats extend forwardly from said pedestals and are supported thereon in cantilevered relation, and

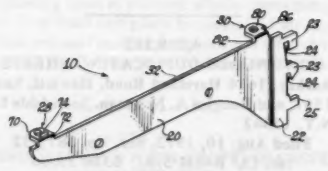
said backs and seats providing a horizontal continous lower berth.

4,018,167

PREASSEMBLED BRACKET AND SHELF ASSEMBLY

Morris H. Spangler, Streamwood, Ill., assignor to Reflector Hardware Corporation, Melrose Park, Ill.

Filed May 2, 1975, Ser. No. 573,982
Int. Cl.² A47B *57/16*
U.S. Cl. 108—152 **8 Claims**



1. A shelf assembly for attachment to at least one standard, comprising an expansive shelf having an upper shelf surface and a lower portion defining at least two groups of spaced slots opening into hollows within said shelf; shelf support brackets for ready selective attachment and removal from said shelf, each bracket having an expansive main body portion, hooks for supporting the assembly on a standard and at least one mounting ear extending laterally from the upper regions of said main body portion, said mounting ears on said bracket being adapted to enter a corresponding group of said slots and to be seated within said hollows, at least one of said ears on each bracket having a protuberance, the combined width of the ear and the protuberance being slightly greater than the width of the slot portion through which the ear entered for accommodating snap-fitting interlocking engagement be-

tween the bracket and said shelf, whereby each of said brackets resists withdrawal and separation from the shelf and in which each said slot associated with a protuberance has a flexible peripheral portion comprising a flexible locking flap, said locking flap being positioned to be flexed inwardly by a said protuberance as said protuberance is pushed inwardly through said slot, and which flap is reflexed outwardly thereby to narrow the slot portion to resist withdrawal of the ear having the protuberance from the shelf.

4,018,168

INCINERATOR FEED

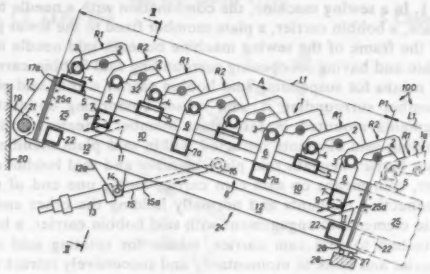
Bruno Andreoli, Mannedorf; Trauterose Fiebig, Zurich, and Gustav Maurer, Volketswil, all of Switzerland, assignors to Von Roll AG, Switzerland

Filed Mar. 10, 1976, Ser. No. 665,722

Claims priority, application Switzerland, Mar. 17, 1975, 3386/75

Int. Cl.² F23B *1/18*

U.S. Cl. 110—38 **20 Claims**



1. In combination, a furnace grate comprising transverse rows of grate elements whereof the elements of each row are arranged side-by-side with one another; clamping means associated with each of said rows and arranged to urge elements of the row towards one another to press their sides into contact with one another; sealing means at the ends of the rows for sealing against said ends of the rows; and biassing means arranged to urge said sealing means into sealing contact with said ends of the rows with urging force independent of the clamping force provided by said clamping means.

4,018,169

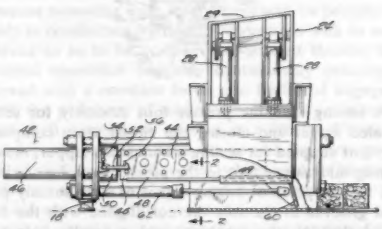
METHOD AND APPARATUS FOR PROCESSING METAL MATERIAL INTO BALES

Roman Schmalz, Milwaukee, Wis., assignor to Logemann Brothers Company, Milwaukee, Wis.

Filed Feb. 9, 1976, Ser. No. 656,708

Int. Cl.² B30B *9/32*

U.S. Cl. 100—39 **11 Claims**



9. A method of processing a car body or similar article into bales comprising the following steps:

a. introducing a car body partially into an upwardly opening baling chamber with a portion of the car body positioned inside the chamber and a portion of the car body positioned outside the chamber;

b. partially crushing and bending the car body by forcing a cover member partially over the open top of the baling chamber to thereby bend the car body into a substantially L-shape with one leg of the L positioned inside the baling chamber and the other leg of the L protruding out of the baling chamber adjacent the free end of the cover member;

c. shearing off the portion of the car body protruding out of the baling chamber and partially crushing the portion of the car body in the baling chamber by moving the head of a first compression ram into the baling chamber, said ram head and cover member having cutting edges thereon which cooperate to produce a shearing action therebetween; and

d. compressing the material in the baling chamber into a completed bale by moving the head of a second compression ram into the baling chamber underneath the cover, the travel path of said second compression head being at right angles to the travel path of said first compression head.

4,018,170

ROTARY HARROWS

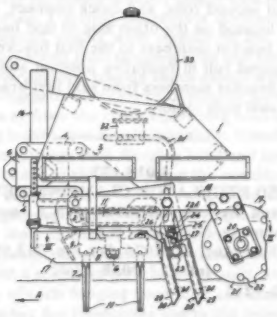
Ary van der Lely, 10, Weverskade, Maasland, and Cornelis Johannes Gerardus Bom, 36, Esdoornlaan, Rozenburg, both of Netherlands

Filed June 26, 1975, Ser. No. 590,520

Claims priority, application Netherlands, June 28, 1974, 7408749

Int. Cl.² A01C *23/02*

U.S. Cl. 111—7 **9 Claims**



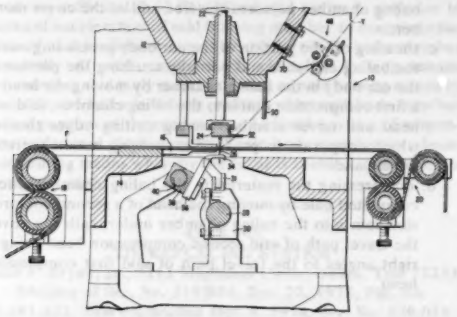
1. A soil cultivating implement or rotary harrow comprising a frame and a plurality of rotatable soil working members, positioned in a row that extends transverse to the direction of travel, said members being supported on said frame to work overlapping strips of soil, driving means engaging said soil working members and rotating same about corresponding upwardly extending axes, at least one elongated roller connected to the frame and extending transverse to the direction of travel, said roller being positioned at the rear of said row of soil working members and having a soil engaging periphery that is formed by elongated elements which extend lengthwise with respect to the axis of rotation of said roller, support means connected to said implement and injectors for introducing fluid material into the worked soil being mounted on said support means and located between the row of soil working members and said roller, said injectors extending downwardly from said support means and below the surface of the ground during operation.

4,018,171

YARN TENSIONING MEANS FOR TUFTING MACHINES

William David Stone, East Ridge, and Alvin Truit Bonner, Sr., Chattanooga, both of Tenn., assignors to The Singer Company, New York, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,828
Int. Cl.² D05C 15/18
U.S. Cl. 112—79 R 4 Claims



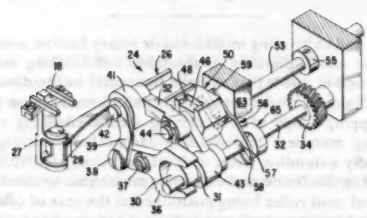
1. In a muliple-needle tufting machine having a multiplicity of yarns fed from guide means to a like member of needles, a pair of rolls between which said yarns pass from said guide means to said needles, means for driving said rolls at a peripheral speed greater than the speed at which said yarns are fed to said rolls, and mounting means for supporting said rolls, said mounting means comprising a first bracket member at each end of a first roll of said pair of rolls and a second bracket member at each end of the second roll of said pair of rolls, means mounting said first bracket members on said tufting machine, means pivotably supporting each second bracket member from a respective first bracket member at a location spaced from one side of a line passing through the centers of said first and second rolls, and quick-connect, quick-disconnect means located on the other side of said line for securing said second bracket members to the first bracket members to lock said second roll in operative position and for releasing said second bracket members from said first bracket members to separate said rolls rapidly.

4,018,172

FEED REGULATOR CLAMPING DEVICE

Stanley Joseph Ketterer, Jamesburg, N.J., assignor to The Singer Company, New York, N.Y.

Filed Aug. 12, 1976, Ser. No. 713,952
Int. Cl.² D05B 27/02
U.S. Cl. 112—215 4 Claims



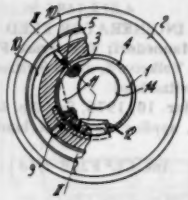
1. In a sewing machine having stitch forming mechanism including a work feeding mechanism actuated cyclically in timed relation with said stitch forming mechanism, a stitch length regulator associated with said work feeding mechanism, and clamp means for said stitch length regulator effective for only a portion of each cycle of operation of said work feeding mechanism.

4,018,173

DEVICE COMPRISING TWO PIECES HELD TOGETHER IN SPACED APART RELATION BY JOINING ELEMENTS

Antonio Jimenez, Meyrin-Geneva, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed Dec. 10, 1975, Ser. No. 639,432
Claims priority, application Switzerland, Dec. 19, 1974, 16989/74
Int. Cl.² D05B 57/14
U.S. Cl. 112—231 7 Claims



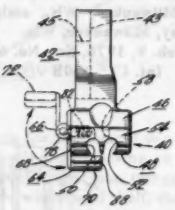
1. In a sewing machine, the combination with a needle hole plate, a bobbin carrier, a plate member fixed to the lower part of the frame of the sewing machine beneath said needle hole plate and having an opening surrounding said bobbin carrier, of means for suspending said bobbin carrier within said plate member surrounding it, said means comprising connecting elements mounted in said plate member, means normally holding said elements retracted within said plate member, a cam barrier beneath said plate member and said bobbin carrier, cam means on said cam carrier facing one end of said connecting elements and normally holding the other end of said elements in engagement with said bobbin carrier, a hook attached to said cam carrier, means for rotating said cam carrier and hook to momentarily and successively retract said connecting elements from said bobbin carrier in synchronization with the driving of a loop of the upper thread around the bobbin carrier and produce engagement of the upper thread with a lower thread fed from a bobbin in the bobbin carrier for the formation of a stitch.

4,018,174

SEWING MACHINE PRESSER FOOT ASSSEMBLY

Ernest A. DiBenedetto, Philadelphia, and Harold S. Lerner, Norristown, both of Pa., assignors to Gordon Clothes, Inc., Conshohocken, Pa.

Filed Jan. 23, 1976, Ser. No. 651,908
Int. Cl.² D05B 29/08
U.S. Cl. 112—235 13 Claims



1. A sewing machine presser foot assembly for setting a concealed zipper and closing the zipper seam comprising a zipper foot adapted for setting a concealed zipper, means for attaching said zipper foot to the presser bar of a sewing machine, said zipper foot having a pair of substantially parallel spaced grooves in the sole thereof aligned with the flow of material through the machine, and a needle hole passing vertically through said zipper foot between said grooves, each of said grooves being adapted to receive the teeth or coil of a concealed zipper, a cording foot bar, and means pivotally

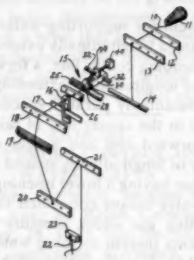
connecting said cording foot bar to said zipper foot for selective movement thereof into either a raised inoperative position or a lowered operative position beneath said zipper foot.

4,018,175

THREAD-TENSIONING MECHANISM FOR THE STOP MOTION MEANS OF A MULTI-NEEDLE SEWING MACHINE

Harold C. Forrester, and Harold E. Tatum, both of Louisville, Ky., assignors to Louisville Bedding Company, Louisville, Ky.

Filed Nov. 17, 1975, Ser. No. 632,384
Int. Cl.² D05B *47/02*
U.S. Cl. 112—254 5 Claims



1. An improved thread-tensioning mechanism for the stop motion means of a multi-needle sewing machine of the type having a group of needle threads wherein each needle thread of the group, in extending from its supply spool to its needle, normally travels through a thread-tensioning section at a speed and tension proportional to its individual rate of variable usage within a given range of usages, embracing all threads in said group, and wherein the tension section of each thread normally carries a sag-sensor for operating the stop motion means when the thread usage falls below said given range, comprising:

A. a common take-over shaft extending across the machine at the beginning of the thread-tensioning section;

B. means for rotating said shaft at a substantially constant speed such that the lineal speed of its periphery is slightly below the slowest normal lineal thread speed created in said given range by the slowest normal rate of thread usage;

C. an idler wheel at the beginning of the tensioning section of each thread; and

D. means mounting each idler wheel with its periphery not only in continuous frictional engagement with its moving thread so as to be continuously rotated thereby during normal operation but also continuously pressing said thread with a constant force into frictional engagement with the periphery of said common shaft so as to cause that shaft normally to operate as a frictional brake tensioning each thread in accordance with the corresponding wheel-shaft speed differential, which varies with the variable rate said thread is used up in a sewing operation,

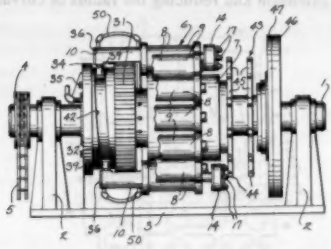
1. said wheel mounting means being independent of and out of operative engagement with the tensioned thread so that said constant idler wheel pressure is not affected by variations in any operating speed or tension condition of the tensioned thread.

4,018,176

APPARATUS FOR SPIN FLANGING CONTAINERS

Andrew Gnyp, and Karl Elert, both of Franklin, Wis., assignors to Jos. Schlitz Brewing Company, Milwaukee, Wis.

Filed Nov. 6, 1972, Ser. No. 304,093
Int. Cl.² B21D *51/00*
U.S. Cl. 113—1 G 1 Claim



1. A machine for spin flanging the open ends of containers comprising, a supporting structure, a drive shaft mounted for rotation with respect to the supporting structure, a turret secured to the drive shaft and disposed to rotate with the drive shaft, container holding means carried by the turret for holding the containers during the spin flanging operation, a series of flanging heads carried by the turret, each flanging head being mounted for rotation about its axis and being mounted for reciprocating axial movement with respect to the turret, a fixed drive gear mounted on the supporting structure and disposed concentrically of said drive shaft, each flanging head including a series of circumferentially spaced freely rotatable flanging rollers disposed to engage the open end of the container to flange the same, a pinion connected to each flanging head and operably engaged with said gear to rotate the flanging heads about their axes as the turret rotates, each pinion and the respective gear having substantially different axial lengths to enable the pinion to move axially with respect to the gear and maintain a driving connection therebetween when the head is moved axially with respect to the turret, cam means interconnecting each flanging head and the supporting structure for moving the flanging heads axially with respect to the turret in programmed sequence to thereby move the heads toward and away from the containers being held by said container holding means, gas supply means for introducing a gas under pressure through each flanging head and into the interior of the container to aid in stripping the container from the flanging head as the head is moved away from the container after the flanging operation, each flanging head includes a flanging head shaft journalled with respect to the turret, said gas supply means includes a chamber in said turret and communicating with a source of gas under pressure, and a passage located axially of each flanging head shaft and communicating with said chamber for conducting gas to the interior of each container.

4,018,177

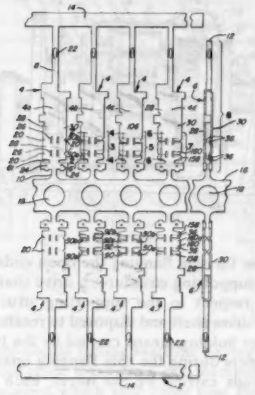
TERMINAL CONNECTORS AND METHOD OF MAKING THE SAME

William H. McKee, West Covina, Calif., and Anthony E. Schubert, Villa Park, Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Continuation of Ser. No. 545,353, Jan. 30, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,457
Int. Cl.² B21D *13/02*
U.S. Cl. 113—119 25 Claims

1. A method of forming a contact jaw in a first portion of a sheet of electrically conductive sheet metal, said first portion being joined to said sheet at opposite ends of said first portion and said sheet being continuous between said ends externally of said first portion, comprising deforming said first portion laterally of the plane of said sheet to form such a jaw, without

corresponding deformation of the joined continuous portion of said sheet, by drawing said first portion into a broad shallow wave form extending on one side of said sheet, said wave form having a first base width; reforming opposite end portions of said first portion within said base width to have curvature opposite that of the center of said wave form and to extend on the opposite side of said sheet therefrom while maintaining the direction of extension and reducing the radius of curvature of



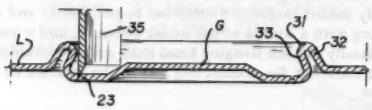
the portion defining the center segment of said wave form; and subsequently further forming said first portion by returning said end portions toward the plane of said sheet and correspondingly further extending said center segment therebetween on said one side of said sheet and further reducing the radius of curvature of said center segment, thereby providing dispersed elongation of the material of said first portion in forming said jaw.

4,018,178

METHOD OF MANUFACTURE OF A GATED CAN LID WITH SCORE AT UPPER SURFACE

Gerald B. Klein, Broomfield, and Frank C. Lowe, Idaho Springs, both of Colo., assignors to Gerald B. Klein, Broomfield, Colo.

Division of Ser. No. 562,559, March 27, 1975, abandoned.
This application Oct. 24, 1975, Ser. No. 625,716
Int. Cl.² B21D *51/44*
U.S. Cl. 113—121 C **5 Claims**



1. The method of forming a can lid blank having a push-down gate in a panel portion of the lid below an aperture in the lid, with a narrow spacing rim underfolded about the aperture whose outward edge joins with the panel portion therebelow, and including the steps of:

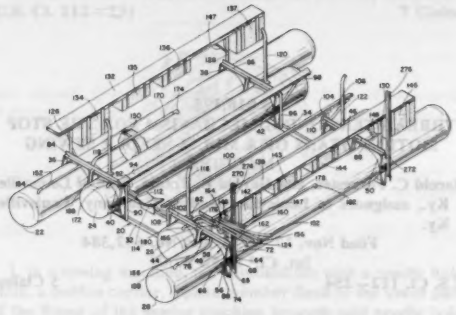
a. drawing a cup downwardly in the lid blank having a bottom area approximating the aforesaid panel portion;
b. drawing a ridge upwardly from the lid blank whose inner wall forms the wall of the aforesaid cup;
c. forming the aforesaid panel portion in the bottom of the cup;
d. cutting a disruptible score line in the formed panel portion adjacent to the ridge to define the outline of the gate therein; and
e. folding the ridge inwardly and downwardly to overlie the score line and form the aforesaid aperture.

4,018,179

PONTOON SYSTEM FOR SUPPORTING WATERCRAFT ON A BODY OF WATER

Henry A. Rutter, Claremore, Okla., assignor to National Hydro-Hoist Company, Claremore, Okla.

Filed Nov. 28, 1975, Ser. No. 635,861
Int. Cl.² B63C *1/06*
U.S. Cl. 114—45 **8 Claims**



2. Pontoon system for supporting watercraft above a body of water comprising a longitudinally extending frame having a longitudinally extending center line, a forward end and a rear end, a plurality of longitudinally extending pontoons held by said frame in substantially parallel spaced relation and substantially parallel to the center line of said frame, each pontoon having a forward end and a rear end, each pontoon having a plurality of longitudinally spaced and separate chambers, each chamber having a lower opening in communication with the water, valve means connected to said chambers for selectively directing gas under pressure into chambers for forming gas pockets therein to force water out of the chambers through the lower openings thereof thereby elevating said frame whereby the frame will engage lower portions of a watercraft for elevation thereof to a position out of the water, said valve means also being adapted to release gas from said chambers selectively for lowering said frame whereby the water craft is lowered into water, and a compressor for supplying gas under pressure to said valve means, said means also adapted to direct gas initially to the chambers at the the forward ends of said pontoons for allowing said forward end of said frame to engage the lower portion of a forward end of the watercraft adjacent said forward end of said frame to elevate the forward end of said watercraft for stabilizing the watercraft prior to the elevation of the entire watercraft; said valve means subsequently also adapted to direct gas under pressure to all of said chambers for completing the supporting of said watercraft above the body of water.

4,018,180

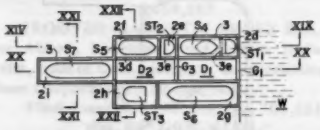
SYSTEM FOR BUILDING AND LAUNCHING SHIPS

Toshio Yoshida, Kobe, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 26, 1976, Ser. No. 670,975
Claims priority, application Japan, Apr. 1, 1975, 50-40095
Int. Cl.² B63B *3/00*
U.S. Cl. 114—65 R **1 Claim**

1. A system for building and launching ships comprising a first dock having a first gate facing open water; a second dock disposed adjacent to and in alignment with said first dock, a second gate connecting said second dock to the end of the first dock remote from said first gate; a plurality of side ship building berth space means located laterally adjacent to said first and second docks; an end ship building berth space means located adjacent to the end of the second dock remote from said second gate, said side and end ship building berth space means having floors at a ground level higher than the bottom

of the docks; detachable water retaining wall means surrounding the docks and all the berth space means, respectively, for retaining water therein; detachable sub-partitioning wall means dividing the space of at least one of said berth space means into at least two berth space sections to enable selective retention of water in only one of the two berth space sections; said water retaining wall means comprising a plurality of wall panels erected on the ground with side edges thereof in sealing abutment with each other; buttresseblocks disposed adjacent



to the inner and outer lower edges of said wall panels to detachably receive therebetween the lower edges of the wall panels, and bracing struts connected between the top of each wall panel and outside anchors on the ground; said docks and berth space means being dimensioned to be supplied with water therein to such a level that a ship placed in any of the berth space means is floated off the floor thereof, such that the ship can be floatingly moved from within the berth space means to the open water through at least said first dock.

4,018,181
LATERAL THRUST CONTROL UNIT FOR WATERCRAFTS

Jochim Brix, Hamburg, Germany, assignor to Schottel-Werft Josef Becker KG, Apay am Rhine, Germany

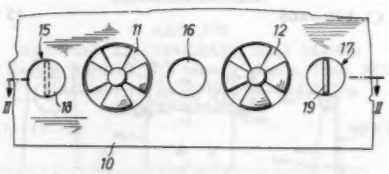
Filed Mar. 28, 1975, Ser. No. 563,211

Claims priority, application Germany, May 14, 1974, 2423468

The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

Int. Cl.² B63H 25/46

U.S. Cl. 114—151 **14 Claims**



1. A lateral thrust control unit for the hull of a watercraft, comprising:

means defining a pair of tunnels which extend transversely to the longitudinal axis of said watercraft and generally between the sidewalls of said watercraft and have propulsion means therein;

means defining zones of differing pressure fields created on the sidewalls of said hull of said watercraft during a longitudinal and simultaneous lateral movement of said watercraft to resist the lateral movement of said watercraft, said zones being positioned longitudinally along said sidewalls of said hull from said pair of tunnels; and

pressure-compensating channel means for connecting at least one of said zones of differing pressure fields to a pressure field of different potential to equalize the pressure differential therebetween and to reduce the resistance to said lateral movement, said pressure-compensating channel means being free of propulsion means therein.

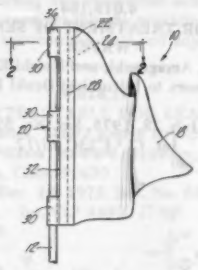
4,018,182
GOLF FLAG ASSEMBLY

Carl W. Knaack, Bloomfield Hills, Mich., assignor to Morris Associates, Inc., Southfield, Mich.

Filed Dec. 11, 1975, Ser. No. 639,801

Int. Cl.² G09F 17/00

U.S. Cl. 116—173 **1 Claim**



1. In combination a golf flagpole and a golf flag assembly, said golf flagpole being of substantially uniform cross-sectional area throughout its length, said golf flag assembly comprising a flag and means for attaching said flag to said flagpole, said attaching means comprising a pair of facing panel members receiving one edge of said flag therebetween, means for securing said panel members to said edge of said flag, said attaching means further comprising a plurality of spaced cylindrical members integrally attached to said panel members, each of said cylindrical members having an inside diameter which is smaller than the outside diameter of said golf flagpole, said cylindrical members being constructed of resilient material so that each said cylindrical members resiliently grasps said flagpole, and the uppermost of said cylindrical members having an upper closed portion to maintain the flag assembly at a fixed position on the top of the flagpole.

4,018,183
APPARATUS FOR TREATING A PLURALITY OF SEMICONDUCTOR SLICES TO A REACTING GAS CURRENT

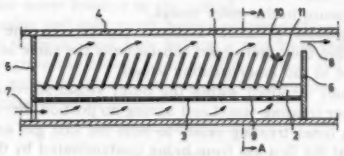
Johannes Meuleman, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 523,439, Nov. 13, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,498

Claims priority, application France, Nov. 15, 1973, 73.40669

Int. Cl.² C23C 13/08

U.S. Cl. 118—49 **2 Claims**



1. Apparatus for treating a plurality of semiconductor slices to a reacting gas current, comprising:

a reactor tube having a longitudinal axis;

means for supporting a plurality of semiconductor slices in a parallel spaced row along said longitudinal axis, said slices being equally spaced to create identical transversely oriented interspaces between slices;

an apertured wall along one side of said row, parallel to said axis and having apertures in the form of slits oriented one to each interspace and parallel thereto;

partitions cooperating with said apertured wall to confine

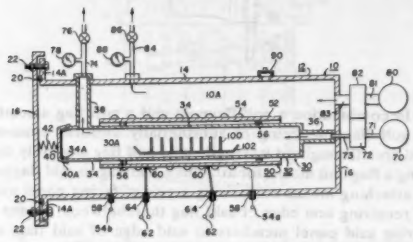
and direct gas flow to one side of said apertured wall, through said slits and the spacing between said slices and out of the reactor tube, the cross-sectional area of the apertures in said apertured wall increasing in the direction of overall gas flow, so that equal flow occurs in each interspace.

4,018,184

APPARATUS FOR TREATMENT OF SEMICONDUCTOR WAFER

Koichi Nagasawa, Amagasaki, and Koichi Kijima, Itami, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed July 28, 1975, Ser. No. 599,471
Int. Cl.² C23C 13/12
U.S. Cl. 118—49.1 **1 Claim**



1. Apparatus for the treatment of a semiconductor wafer comprising:
an inner treating vessel,
an outer vessel,
the inner treating vessel being disposed within the outer vessel,
a semiconductor wafer disposed within the inner treating vessel,
a first gas feeder,
a first pressure adjuster,
a second gas feeder,
a second pressure adjuster,
means connecting the first gas feeder to the first pressure adjuster,
means connecting the first pressure adjuster to the inner treating vessel,
means connecting the second gas feeder to the second pressure adjuster,
means connecting the second pressure adjuster to the outer vessel,
the first pressure adjuster maintaining the pressure within the inner treating vessel substantially the same as the pressure in the outer vessel,
the second pressure adjuster maintaining the pressure within the outer vessel substantially the same as the pressure in the inner treating vessel,
a heater disposed within the outer vessel surrounding the inner treating vessel and having no portion thereof within the inner treating vessel to heat the first gas and to prevent the first gas from being contaminated by the heater.

4,018,185

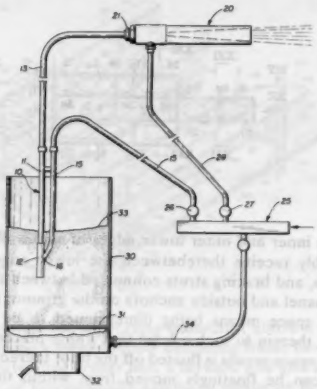
POWDER FEEDER PICK-UP TUBE

James Lewis Myers, Golden, Colo., assignor to Coors Container Company, Golden, Colo.

Filed Dec. 15, 1975, Ser. No. 640,396
Int. Cl.² B05B 7/14
U.S. Cl. 118—308 **12 Claims**

1. A powder feeder pick-up tube for use with a supply of compressed propellant gas and a hopper containing finely divided powder, comprising

a. a powder delivery tube carrying powder entrained in propellant gas from said hopper to a point of use and having an open end for receiving the powder and propellant gas,
b. a propellant delivery tube concentric with said powder delivery tube and forming an annular area between the walls of the two tubes, the annular area having an orifice adjacent the opening of the powder delivery tube for delivering propellant gas through said orifice



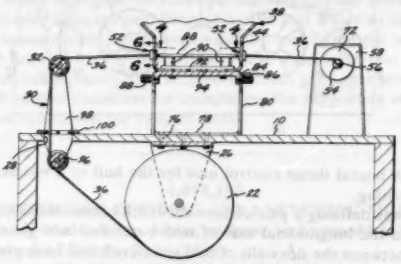
c. means directing the gas flow from the propellant delivery tube through said orifice and into a converging conical jet of high velocity gas for deagglomerating powder from said hopper and evenly entraining the powder in the gas, and
d. means supplying said propellant gas to the propellant delivery tube from said supply of compressed propellant gas.

4,018,186

GAUZE IMPREGNATOR

Charles E. Schrader, 8536 Oak Park Ave., Northridge, Calif. 91325

Filed May 5, 1975, Ser. No. 574,439
Int. Cl.² B05C 3/12
U.S. Cl. 118—405 **15 Claims**



1. An apparatus for the uniform impregnation of a viscous material into the open pores of a fibrous band at atmospheric pressure which comprises:
a chamber charged with said viscous material;
first and second slots in opposite side walls of said chamber open to atmospheric pressure;
first and second resilient membrane seals overlying each of said slots and each bearing a fabric band receiving slit;
means for removably supporting a roll of continuous fabric band and supplying said band to the first of said silts;
spindle means for receiving said fabric band from the second of said silts and for winding said received band into a roll;

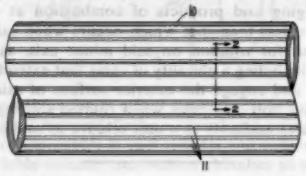
and stationary platform plate means carried fixedly within and above the bottom of said chamber at the level of said slits and extending between said opposite side walls and bearing a plurality of apertures therethrough whereby said continuous fabric band can be passed between said slits, through said chamber and the viscous material and in contact with said plate means, to receive a uniform impregnation of viscous material contained within said chamber.

4,018,187

GROOVED MAGNETIC BRUSH ROLL

Jerry Joe Abbott, Longmont, and Allison Holland Caudill, Lafayette, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,251
Int. Cl.² G03G *15/08*
U.S. Cl. 118—658 **7 Claims**



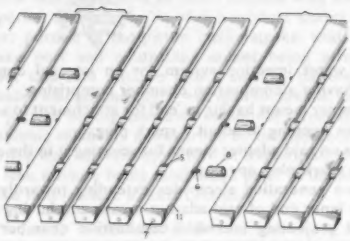
1. A magnetic brush developer wherein a developer material comprising a toner coated magnetic carrier is supplied to a rotating magnetic brush roll to be conveyed by said roll to an elevated development zone, said roll comprising:
a rotatably mounted hollow roll;
magnetic means disposed within said hollow roll for creating a magnetic field in the path of the periphery of said roll;
means to bring said developer material into contact with the roll surface;
said roll surface containing axially located grooves spaced apart in a range from 15–25 times the diameter of said carrier.

4,018,188

REINFORCED CONCRETE SLAT FLOOR

James Reuben Burdette, 418 Moody, Martin, Tenn. 38237

Filed June 10, 1975, Ser. No. 585,717
Int. Cl.² A01K *1/00*
U.S. Cl. 119—28 **5 Claims**



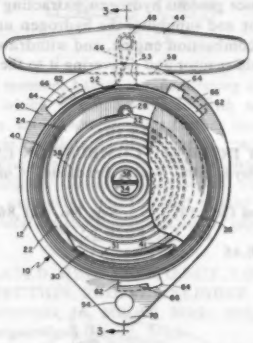
1. A load distributing and interconnecting slat floor module which may be connected to other interconnecting slat floor modules for supporting loads while simultaneously permitting waste and debris to drop through spaces between the slats, said slat floor module comprising spaced apart elongated slats of trapezoidal cross section, each slat having a top surface wider then the bottom surface and generally parallel to the bottom surface and having inwardly sloping slat sides, a longitudinal reinforcing member extending along the length of the slat adjacent the bottom surface of each slat for increasing the strength of the slat, a transverse reinforcing member fixed to the slats and extending in a generally perpendicular direction between the slats and through the slats, said transverse reinforcing members being spaced from the ends of the slats and extending beyond the outer slats in each module, and means for rigidly connecting the transverse reinforcing members between adjacent modules thereby providing load distributing interconnections between the slats and adjacent modules.

4,018,189

RETRACTABLE DOG LEASH

James Otis Umphries, 14602 Rodeo Drive, Victorville, Calif. 92392, and William Howard Brawner, 1174 Cloverleaf Drive, El Cajon, Calif. 92020

Filed Dec. 18, 1975, Ser. No. 642,179
Int. Cl.² A01K *27/00*
U.S. Cl. 119—109 **2 Claims**



1. A retractable animal leash comprising:
a casing having a circumferential wall, said wall having circumferentially extending slots therein with undercut flanges over portions of said slots,
a flexible leash member,
a reel rotatably supported within the casing for carrying said leash member, said leash member being wound about said reel and extending externally of said casing for the unwinding of said leash member,
spring means engaging said casing and said reel continuously urging the same in opposition to the unwinding of said leash member,
said casing having a cover detachably secured to one side thereof, said cover having hooked lugs for insertion into said slots and engagement under said flanges by rotation of the cover relative to the casing,
said casing and said cover having corresponding extended lugs thereon, said lugs having a common hole therethrough in the closed position of the cover, and
a ring member removably engaged through said hole for attachment to an animal.

4,018,190

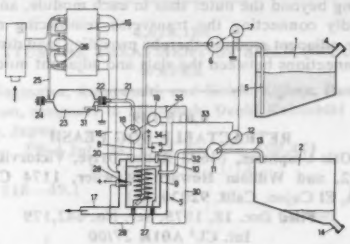
METHOD OF AND APPARATUS FOR FEEDING HYDROGEN FUEL TO ENGINES

Claude Henault, Chevilly Larue, France, assignor to Regie Nationale des Usines Renault and Automobiles Peugeot, both of France

Filed May 20, 1975, Ser. No. 579,294
Claims priority, application France, May 24, 1974, 74.18135
Int. Cl.² F02B *43/08*
U.S. Cl. 123—3 **19 Claims**

1. In a motor vehicle propulsion system including an internal combustion engine, a method of producing gaseous hydro-

gen from metal hydride and feeding the hydrogen as fuel to said engine during operation of the vehicle, said method comprising the steps of providing a supply of fresh hydride in a first tank, providing a second tank for receiving spent hydride, feeding the fresh hydride at a controlled rate from the first



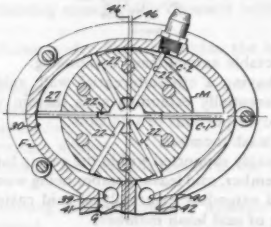
tank to a low-capacity reactor heating the hydride in the reactor to produce gaseous hydrogen, extracting the hydrogen from the reactor and supplying the hydrogen under pressure to the internal combustion engine, and withdrawing the spent hydride from said reactor and delivering it to the second tank.

4,018,191

ROTARY INTERNAL COMBUSTION ENGINE

L. Babcock Lloyd, 508 South Bradfield, Compton, Calif. 90221

Filed Oct. 14, 1975, Ser. No. 621,866
Int. Cl.² F02B *55/14*
U.S. Cl. 123—8.45 1 Claim



1. An internal combustion rotary engine of the type that includes a housing having an interior open end cavity in the shape of an ellipse that has a continuous surface and a major and a minor axis, and major and minor axis dividing said ellipse to first, second, third and fourth quadrants, said housing having an air-fuel inlet and a products of combustion discharge outlet formed therein that are separated by a transverse partition and are in communication with said first and fourth quadrants of said cavity; an assembly that includes a rotor having circumferentially spaced, radially extending slots formed therein, first and second axially aligned shafts projecting outwardly from opposite ends of said rotor, and a plurality of blades slidably supported in said slots, said blades having outer ends that slidably and sealingly engage the surface of said housing that define said cavity when said blades are moved outwardly by centrifugal force as said rotor rotates, with each of said pair of blades in combination with said rotor and housing cooperatively defining a chamber that varies in volume as said rotor rotates towards said fourth quadrant, and each of said chambers being reduced to substantially zero volume to discharge said products of combustion through said discharge outlet as said chamber moves from said fourth quadrant to said first quadrant; means for firing said air-fuel mixture in each of said chambers as the latter enter said third quadrant and have the exposed surface area of the leading blade defining said chamber greater than the exposed surface area of the trailing blade defining said chamber; wherein the improvement comprises:

a. first and second side plates that sealingly engage opposite sides of said housing to close said cavity thereon, and rotatably support said first and second shafts, with said rotor and blades disposed in said cavity;

b. first means for holding said side plates in sealing engagement with said housing and said first means including:

1. a plurality of bolts, with each bolt including a head and at least a partially threaded shank, with each shank extending through one of said pair of openings; and

2. a plurality of nuts that engage said threaded shanks, with said nuts when tightened cooperating with said heads of said bolts to hold said first and second side plates in sealing engagement with said housing; and

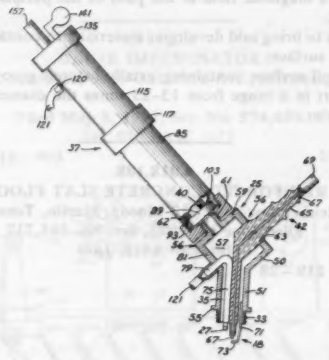
c. second means for sliding said first and second side plates and assembly relative to said housing while maintaining said sealing engagement to increase the volume of each of said chambers as it moves through said third and fourth quadrants relative to the volume thereof when moving through said first and second quadrants, and by so doing discharging said products of combustion at a residual pressure less than that which occurs when said rotor is centered for rotation on said minor axis, said second means including a plurality of cams that extend from said shanks and engage the exterior surface of said housing, with said bolt and cams when rotated shifting said side plates and assembly as a unit relative to said housing.

4,018,192

WATER INJECTION SYSTEM FOR I.C. ENGINES

Sheldon E. Eft, 1014 E. Taylor St., Bloomington, Ill. 61701

Filed July 3, 1975, Ser. No. 592,823
Int. Cl.² F02D *19/00*
U.S. Cl. 123—25 C 8 Claims



1. A water injection system for an internal combustion engine having a combustion chamber comprising,

an adapter means having an end for attachment to an engine at an opening to admit a spark plug,

means on said adapter means for securing it to the engine at the spark plug opening,

ignition generating electrodes extending inwardly beyond the inner end of said adapter means and having an inner end projecting into said combustion chamber of said engine,

water injector nozzle means extending to the inner end of said adapter means and through the opening into the combustion chamber from said adapter means and having a nozzle in the engine combustion chamber for injecting moisture into a combustion chamber,

and injection means connected to said nozzle means to deliver water under pressure to said injector nozzle means for injecting the water directly into the combustion cham-

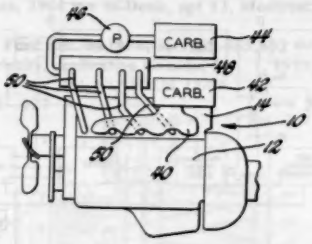
ber against the pressure of the compressed air fuel mixture in the combustion chamber.

4,018,193

VORTEX CHAMBER STRATIFIED CHARGE ENGINE

Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 10, 1975, Ser. No. 548,683
Int. Cl.² F02B 3/00
U.S. Cl. 123—30 C 3 Claims



1. The combination in a four-stroke cycle internal combustion engine of means defining a closed end cylinder

a piston reciprocable in said cylinder and defining therewith a variable volume combustion chamber at said cylinder closed end

main inlet and exhaust ports connecting with said cylinder at said closed end

inlet and exhaust valves respectively associated with said ports and operable to close and open their connections with said cylinder, said inlet port and its associated inlet valve being arranged to direct incoming air in a swirling motion around the axis of said cylinder, said inlet valve being connected for operation in timed relation with said piston to be open during substantially the entire piston intake stroke,

means to supply a lean air-fuel mixture to said inlet port for admission to said cylinder during said intake stroke for formation of a swirling charge in said combustion chamber,

spark ignition means in said cylinder and centered on the closed end thereof.

an auxiliary inlet port, substantially smaller than said main inlet port and connecting with said cylinder,

means to supply a rich air-fuel mixture to said auxiliary inlet port, and

means controlling the admission of said rich mixture to said cylinder from said auxiliary inlet port, said controlling means being operative in timed relation with said piston to permit such admission of rich mixture during only the latter portion of the piston intake stroke, said auxiliary intake port and controlling means being arranged to direct said rich mixture into a swirling pattern at said cylinder end around said spark ignition means, said swirling pattern having the same rotational direction as and remaining relatively undisturbed by the adjacent mass of swirling lean mixture by virtue of the swirling motion of the lean mixture being established prior to the admission of the rich mixture to said cylinder.

4,018,194

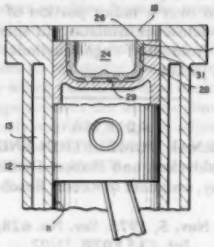
ENGINE PISTON WITH INSULATED COMBUSTION CHAMBER

Edward Mitchell, Hopewell Junction, and John M. Cobb, Cold Spring, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,669
Int. Cl.² F02B 3/00
U.S. Cl. 123—32 C 1 Claim

1. In a piston for an internal combustion engine which utilizes fuel injection to establish a combustible fuel-air mixture within the engine combustion chamber said piston including; a body with a head having a face which opens into a combustion chamber into which fuel is introduced to establish the combustible mixture,

an insert member fixedly positioned within said piston body and being supportably spaced from the latter to define a thermal barrier whereby to substantially insulate said combustion chamber from the piston thereby to minimize heat flow therebetween,



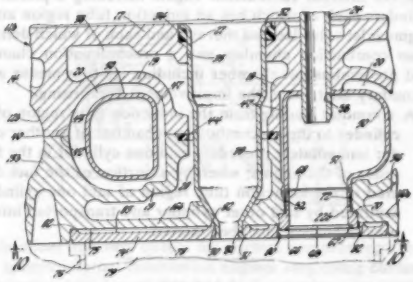
said insert member having means forming a recessed cavity therein which is communicated with said combustion chamber, said insert member further including an outer wall having a plurality of discretely spaced conical segments depending outwardly from said insert member wall and having the conical points of said segments at least partially embedded into the wall of said piston whereby said thermal barrier comprises an air gap.

4,018,195

INSULATED, HIGH EFFICIENCY, LOW HEAT REJECTION, ENGINE CYLINDER HEAD

Michael Bandrowski, Jr., Milford, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 6, 1975, Ser. No. 619,797
Int. Cl.² F01P 3/14; F02F 1/26
U.S. Cl. 123—41.76 2 Claims



1. A cylinder head for an internal combustion engine having a lower wall, an upper wall spaced from the lower wall and a side wall interconnecting the upper and lower walls, said lower wall having an outer surface containing a recess adapted for mounting opposite the end of an associated engine cylinder with said recess extending laterally across and beyond the inner diameter of such cylinder,

an exhaust cavity within said head and extending through an opening in said side wall,

a plurality of spaced exhaust ports through the recessed portion of said lower wall and connecting with said exhaust cavity,

a component receiving tubular wall retained in said upper wall and extending through the recessed portion of said lower wall between said exhaust ports,

means defining a coolant jacket in said head along said lower wall and around said exhaust ports and component receiving wall,

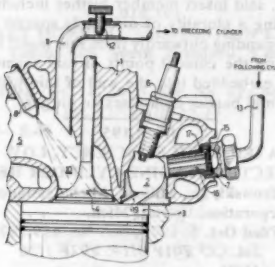
a high temperature metal alloy plate received in and substantially filling said lower wall recess, said plate providing an outer surface engageable with and adapted to close the end of such associated cylinder and having openings in alignment with said exhaust ports and said component receiving wall,

said plate including an inner surface in opposed relation to the recessed outer surface of said head lower wall and spacer means along the peripheries of said plate and said plate openings and separating the remainder of said opposing surfaces to provide clearance between said plate and said head over a major portion of said plate inner surface and enclose an insulating air space that limits the flow of heat from such engine cylinder to the cylinder head coolant jacket.

4,018,196
INTERNAL COMBUSTION ENGINE

Ernst Linder, Muhlacker, and Hubert Dettling, Hohenacker, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 5, 1975, Ser. No. 628,904
Int. Cl.² F02B *75/02*
U.S. Cl. 123—75 B **4 Claims**



1. An internal combustion engine including a plurality of cylinders each of which has an induction tube region and an engine inlet valve located therein, and each of which defines a main combustion chamber and a precombustion chamber, said precombustion chamber including ignition means and a secondary inlet valve, the improvement comprising:

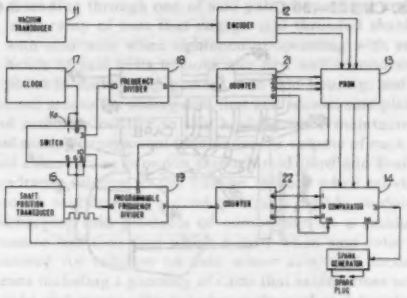
A. a conduit leading from the induction tube region of one cylinder to the precombustion chamber of another cylinder immediately preceding said one cylinder in the firing order of the engine; whereby a portion of the fuel delivered to the induction tube region of said one cylinder is aspirated by said other cylinder and transported into the precombustion chamber thereof.

4,018,197
SPARK IGNITION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Peter Hugh Salway, Birmingham, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Aug. 19, 1974, Ser. No. 498,874
Claims priority, application United Kingdom, Sept. 12, 1973, 42819/73
Int. Cl.² F02P *1/00*
U.S. Cl. 123—117 D **7 Claims**

1. A spark ignition system for an internal combustion engine comprising the combination of an engine having at least one spark plug, an engine driven transducer producing a pulse train at a frequency dependent on the speed of the engine, speed computing means connected to said transducer and periodically operating to produce a first multi-bit digital signal, sensor means for producing a second multi-bit digital signal, corresponding to another engine operating parameter, an empirically programmed read only digital memory device having input terminals connected to said speed computing sensor means and to said means and having output terminals for producing a third multi-bit digital output signal determined by the first and second multi-bit digital input signals supplied thereto, an engine shaft position computing means connected to said transducer and producing a forth multi-bit digital output signal varying with the displacement of the transducer from a datum position, a comparator connected to the read

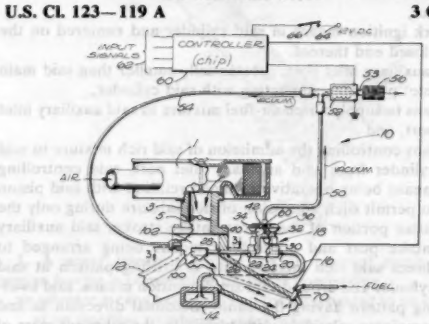


only digital memory device and the position computing means and producing a single pulse trigger signal output when the instantaneous value of the fourth multi-bit digital output signal from the position computing means is equal to the third multi-bit digital output signal from the read only digital memory device, and ignition control means connected to said comparator and to said spark plug so as to be triggered into producing a spark at said spark plug by said trigger output from the comparator.

4,018,198
EXHAUST GAS RECIRCULATING SYSTEM

Elmer A. Williams, Gardena, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 7, 1974, Ser. No. 495,360
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. An exhaust gas recirculating system for a vehicle internal combustion engine provided with an intake manifold comprising:

injection means for governing injection of exhaust gases into the intake manifold responsive to application of intake manifold vacuum;

vacuum control means for allowing application of vacuum to said injection means only when activated;

sensing means for sensing vehicle operating parameters, said parameters being transmission position, engine temperature, engine RPM, and manifold vacuum;

control means responsive to input signals from said sensing means for selectively transmitting an activating signal to activate said vacuum control means, said control means

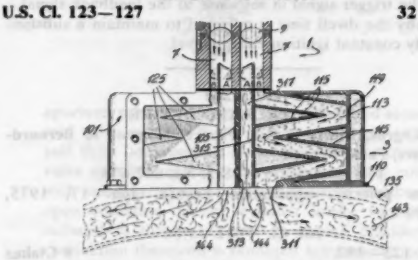
transmitting said activating signal only when all said input signals are representative of all said sensed vehicle operating parameters being within a range of preselected values; and

dispersing means connected to said injection means for dispersing the exhaust gases injected into the intake manifold to all cylinders of the engine equally.

4,018,199
CARBURATION SYSTEM FOR AN INTERNAL COMBUSTION

Istvan Furucz, 3964 rue St-Denis, apt 12, Montreal, Quebec, Canada

Filed Feb. 5, 1976, Ser. No. 655,632
Claims priority, application Canada, Feb. 7, 1975, 219576
Int. Cl.² F02M *13/06*
U.S. Cl. 123—127 **32 Claims**



1. Carburation system for internal combustion motor operating with a mixture of fuel vapor and air, said system in its simplest aspect being provided with a carburetor operating in the characteristic manner of an injection system, said carburation system having only one carburation chamber and one fuel reservoir, said carburation chamber being provided with means to control admission of air, said carburation system being characterized in that:

the carburation chamber, below the means for controlling the admission of air is doubled according to a predetermined dimension ratio thus forming two compartments which are independent of one another each having a different function but operating together to enable carburation;

the reservoir of the carburetor is fed by a fuel pump under constant pressure, through an adjustable pressure regulator, enabling to vary the pressure inside the said reservoir so that for a given pressure and independently of the depression exerted by the motor-cylinders on the carburation chamber, the flow of fuel is regularized by adjusting the opening of valves mounted in said reservoir or in communication with the latter;

the pressure regulator is connected to control means enabling to vary the pressure inside the reservoir of the carburetor depending on the behavior of the motor;

a motor fuel variable flow valve feeding the first of the two compartments of the carburation chamber, said valve operating to supply the quantity of the fuel required for all the operating conditions of the motor;

controlled valve operating intermittently feeding into the second compartment of the carburation chamber so that said valve can supply an excess of fuel necessary for starting the motor when it is cold;

means to automatically adjust the opening of the air admission butterfly valve with respect to the opening of said variable flow fuel valve, so as for a given pressure to enable the carburation chamber to introduce a flow of vapor fuel and air having a relatively constant volume ratio under all operating conditions of the motor;

a heat exchanger connected downstream to said carburetor, said heat exchanger and said carburetor being separated by a high-performance thermic insulator, said heat exchanger comprising a body provided with a heat exchange duct, connecting said first compartment of the carburation chamber to the motor-cylinders, means to bring the combustion gases around said heat exchanger duct to heat the heat exchanger, in order that the fuel supplied by the motor fuel variable flow valve when said fuel passes through said duct can be converted into vapor;

the body of said heat exchanger is unitary and removable in order to be easily removed to exchange it or to carry a periodic cleaning;

an unheated passage connecting said compartment of the carburation chamber with the motor-cylinders;

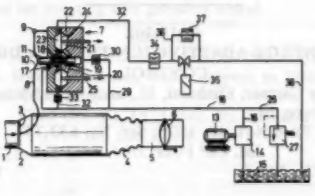
in order to decrease the power losses of the explosion in the motor-cylinders resulting from the prematured dilatation of the air which passes along with the fuel in the heat exchange duct, said heat exchanger being provided with control means to regularize the proportion of the quantitities of air which pass in the heat exchange duct and the direct passage towards the motor-cylinders;

and automatically operated means to adjust the position and the action of said control means depending on the temperature of the combustible mixture at the inlet of the motor-cylinders.

4,018,200
FUEL INJECTION SYSTEM WITH FUEL PRESSURE CONTROL VALVE

Gerhard Stumpp, Stuttgart; Wolf Wessel, Schwieberdingen; Volkhard Stein, Stuttgart, and Wilfried Sautter, Ditzingen-Schockingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 13, 1974, Ser. No. 497,123
Claims priority, application Germany, Oct. 3, 1973, 2349616
Int. Cl.² F02M *39/00*; F02D *1/04*
U.S. Cl. 123—139 AW **12 Claims**



1. In a fuel injection system for mixture compressing externally ignited internal combustion engines employing continuous injection into a suction tube which contains a measuring member as well as an arbitrarily actuatable butterfly valve, one disposed behind the other, and wherein said measuring member can be displaced by flowing air depending on air flow rate through said suction tube and in opposition to a resetting force and wherein the flowing air displaces a movable member of a metering valve disposed within a fuel supply line for the purpose of metering out a fuel quantity in proportion to the air quantity, the metering taking place normally while substantially a constant pressure difference prevails, the improvement comprising: a control pressure circuit which includes a first throttle; and a solenoid valve disposed in said control pressure circuit for controlling the flow in the control pressure circuit and thereby changing the pressure difference at said first throttle, said metering valve being controllably associated with said first throttle so that the pressure difference at said metering valve can be changed by the pressure difference at said first throttle.

4,018,201
FUEL SUPPLY SYSTEMS FOR DIESEL ENGINES

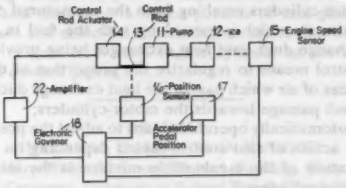
Malcolm Williams, Solihull, and Christopher Robin Jones, Alcester, both of England, assignors to C.A.V. Limited, Birmingham, England

Filed May 15, 1975, Ser. No. 577,644

Claims priority, application United Kingdom, May 17, 1974, 22105/74

Int. Cl.² H02J *1/00*

U.S. Cl. 123—139 E **5 Claims**



1. A fuel supply system for a diesel engine comprising in combination a pump for supplying fuel to the engine, an electrically operated actuator for controlling the output of the pump, a pair of D.C. supply lines, a voltage regulator for restricting the potential across said supply lines to a first predetermined value, a series circuit connected across said supply lines and including a resistor, a relay winding and a first transistor, first means for turning said transistor off when the current flowing in the actuator exceeds a predetermined value, including a Zener diode which is arranged to break down when the current flow through the actuator exceeds said predetermined value, a second transistor which is turned on by the current flow in the Zener diode, said second transistor removing the base drive to said first transistor when rendered conductive, second means operable upon de-energization of the relay winding when the transistor is turned off for preventing operation of the actuator, switch means for short-circuiting said resistor if the potential between the supply lines falls below a second predetermined value and third means for maintaining the current flow in said Zener diode when the actuator is turned off.

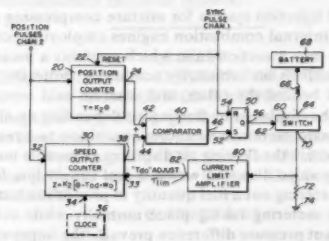
4,018,202
HIGH ENERGY ADAPTIVE IGNITION VIA DIGITAL CONTROL

Todd Henry Gartner, Elmhurst, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 20, 1975, Ser. No. 633,737

Int. Cl.² F02P *3/04, 5/04*

U.S. Cl. 123—148 E **12 Claims**



1. A system for controlling the ignition dwell of an internal combustion engine comprising

an ignition pulse generating means, coupled to the engine, and producing ignition pulses suitable for ignition firing,

a position pulse generating means coupled to the engine and producing position pulses representative of engine angular position,

a first circuit means for producing the position pulses and producing an output signal representative of engine position said first means being resettable to an initial state prior to the occurrence of the first position pulse following a trigger pulse,

a second circuit means for processing the position pulses and producing an output representative of engine RPM,

a comparator means for comparing the first circuit means output with the second circuit means output and producing a trigger signal in response to a predetermined relationship between the two outputs,

switch means for initiating dwell time in response to a trigger signal from the comparator means and firing the ignition in response to an ignition pulse,

means for generating a feedback signal representative of the ignition energy level and,

control means for predeterminedly altering the occurrence of the trigger signal in response to the feedback signal,

whereby the dwell time is adjusted to maintain a substantially constant ignition energy level.

4,018,203
DECOMPRESSING DEVICE

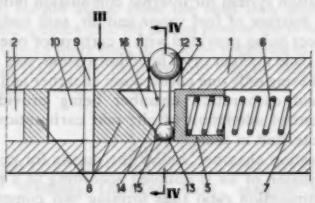
Andre Legros, Marly le Roi, France, assignor to Bernard-Moteurs, Paris, France

Filed Jan. 9, 1976, Ser. No. 647,674

Claims priority, application France, Jan. 17, 1975, 75.01559

Int. Cl.² F01L *13/08*

U.S. Cl. 123—182 **9 Claims**



1. A decompression device for facilitating starting of an internal combustion engine, comprising piston means movable in an axial direction in a bore in an engine camshaft and urged in an axial direction by hydraulic pressure from an engine-driven oil pump against the action of resilient means; and a lever having a first end forming a retractable protrusion able to move radially of the camshaft in an aperture in the camshaft so that in an extended position the protrusion causes opening of an engine valve and in a retracted position does not cause opening of the valve, the other end of the lever being movable by said piston means sliding in the camshaft so that the first end moves from the extended position towards the retracted position as the hydraulic pressure increases.

4,018,204
FUEL SAVING APPARATUS FOR MULTIPLE CYLINDER INTERNAL COMBUSTION ENGINES

Earl W. Rand, Jr., 2101 Washington, Kansas City, Mo. 64108

Filed Jan. 2, 1976, Ser. No. 646,361

Int. Cl.² F02D *9/00*

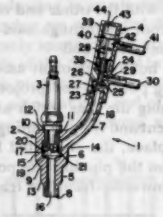
U.S. Cl. 123—198 F **10 Claims**

1. A fuel saving apparatus for multiple cylinder spark ignition internal combustion engines having a carburetor filtered air portion, said apparatus comprising:

a. an elongated tubular body member including an externally threaded first body portion adapted for sealing engagement within an engine cylinder spark plug aperture;

b. an apertured second body portion being internally threaded and adapted for sealingly receiving and engaging therein a spark plug;

c. a third body portion disposed adjacent said second body portion and including an aperture therethrough;
d. said body member including a central longitudinal aperture interconnecting the first, second and third body portions; and
e. a valve member in said third body portion and adapted to move between an open and a closed condition respectively for opening and closing said third body portion



aperture, said valve member having first and second ends; said valve member first end being sealingly attached to said third body portion about the aperture therein; said valve member second end being adapted for connection with said filtered air portion; said valve member, in said open condition causing cylinder intake vacuum to be reduced to the extent that an engine cylinder having connection therewith is rendered temporarily ineffective and engine fuel consumption is thereby reduced.

4,018,205

ARCHERY BOW WITH ARCUATE LIMB ATTACHMENTS

Leonard S. Meyer, 6449 Bridgewood Road, Columbia, S.C. 29206

Division of Ser. No. 278,932, Sept. 8, 1972, Pat. No. 3,965,883. This application Dec. 18, 1975, Ser. No. 642,128
Int. Cl.² F41B 5/00
U.S. Cl. 124—24 R **4 Claims**

1. An archery bow comprising a handle section with a hand grip positioned substantially intermediate the ends thereof the ends of said handle section projecting a substantial distance in opposite directions from the hand grip, thereof and bow limbs each comprising an arcuate member and having a concave configuration with one end thereof connected to the handle section and the other end thereof having a nock for receiving an end of a bow string, the limbs being connected to compression side of the handle section with the concave sides of the limbs presented away from each other.

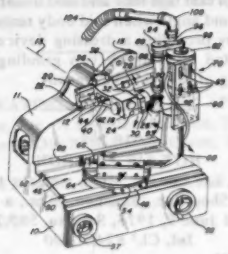
4,018,206

MACHINE FOR DRESSING FIXED-SUPER-ABRASIVE TOOLS

Carle W. Highberg, Rolling Meadows, and John Dolido, Northbrook, both of Ill., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Aug. 11, 1975, Ser. No. 603,669
Int. Cl.³ B24B 53/04
U.S. Cl. 125—11 CD **6 Claims**

1. A machine for dressing fixed-super-abrasive tools comprising in combination:
a. a base with upstanding frame;
b. a driven arm pivotally supported on said frame for at least limited vertical arc-like oscillatory movement about a horizontal axis;
c. a workpiece holder assembly suitable for holding the fixed-super-abrasive tool to be dressed and releasably securable to said arm at any predetermined position relative to said horizontal axis whereby the workpiece in said workpiece holder assembly is vertically oscillated about a horizontal axis at a first predetermined radius;
d. a grinder support bed on said base horizontally movable with respect thereto, said grinder support bed also being controllably oscillatable about a vertical axis through at least a limited horizontal arc;
e. a cylindrical grinding wheel rotatable about a vertical axis and upstandingly supported on said grinder support bed,



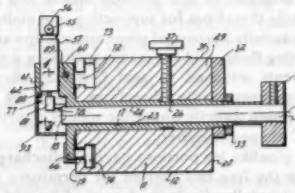
the abrasive content of said grinding wheel consisting essentially of conventional abrasives having a hardness on the Knoop scale of less than about 3000 kg/mm², said grinding wheel being disposed to traverse adjacent said workpiece holder assembly in a horizontal arc-like movement and to bring its outer surface in line contact with the surface of the fixed-super-abrasive workpiece as said grinder support bed controllably oscillates at a second predetermined radius, whereby the fixed-super-abrasive surface of the workpiece is dressed by the relatively fast wearing conventional abrasives of said outer surface of said rotatable grinding wheel; and
f. means for rotating said grinding wheel.

4,018,207

DEVICE FOR DRESSING GRINDING WHEELS

Wayne O. Garrett, Amelia, Ohio, assignor to William Berry, Cincinnati, Ohio

Filed Oct. 14, 1975, Ser. No. 622,152
Int. Cl.² B24B 53/04
U.S. Cl. 125—11 B **9 Claims**



1. A device for dressing a grinding wheel, said device comprising
a body in the form of a block presenting first and second planar mounting faces, said faces being perpendicular one to the other, and each of said faces being adapted to lie flush on a planar support surface in use,
a head mounted at one end of said body for selective rotation on an axis parallel to said perpendicular mounting faces, the angular position of said head relative to said body being adjustable by turning said head about said axis,
a dressing tool mounted on said head for reciprocal sliding

movement relative to said head, said dressing tool being adapted to reciprocate in a linear path that is parallel to a linear path radially extending from said axis,

sine bar means connected to said head, said sine bar means being adapted to accurately set the angulation of said head at a first angle with respect to said first mounting face and at a second angle with respect to said second mounting face,

said sine bar means including a platform removably seatable in a groove in an opposite end of said body to project therefrom as a cantilever parallel to said axis, and a rotatable plate angularly positioned by abutment with gauge blocks when the latter are stacked on said platform,

lock means for fixing said head to said body at that desired angular position as set by said sine bar means, and

means for moving said dressing tool along said linear path, said linear path determining said first angle when said body rests on said first face and said linear path determining said second angle when said body rests on said second face, thereby providing a dressing device for a grinding wheel adapted to establish two grinding angles with a single setting of said sine bar means.

4,018,208

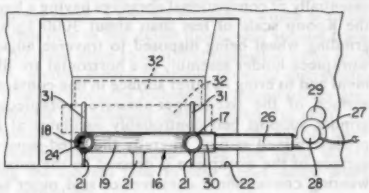
HOT AIR ANDIRON

David Hamilton, Lee County, Miss., assignor to Tom Lauderdale Machine Shop, Inc., Shannon, Miss., a part interest

Filed June 9, 1975, Ser. No. 585,328

Int. Cl.² F24B 7/00

U.S. Cl. 126—121 **9 Claims**



1. A combined heater-andiron for a fireplace, comprising:

andiron means for supporting thereon logs which are to be burned, said andiron means consisting of a C-shaped member formed from a hollow pipe and including a pair of hollow pipelike leg portions disposed in substantially parallel relationship and interconnected by a pipelike center portion, the space within said C-shaped member being completely open;

leg means attached to said andiron means and projecting downwardly therefrom for supporting said andiron means in a substantially horizontal plane spaced upwardly above a supporting floor, said leg means including a plurality of leg elements attached to said C-shaped member and projecting downwardly therefrom, said leg elements being disposed directly under the pipelike portions forming the C-shaped member;

one of said pipelike leg portions having a discharge opening formed in the free end thereof for permitting a substantially horizontally directed stream of heated air to be discharged from said C-shaped member, the other pipelike leg portion being closed in the vicinity of the free end thereof;

said discharge opening as formed in the free end of said one pipelike leg portion comprising the sole discharge opening for the discharge of heated air, and the free end of said other pipelike leg portion having plug means associated therewith for closing same, said plug means being spaced inwardly from the free end of said other leg portion so as to give the free end of said other leg portion the appearance of an open pipe;

an air supply pipe connected to said other pipelike leg portion at a location spaced inwardly from said plug means for supplying cool air into the interior of said C-shaped member, said air supply pipe having one end thereof connected to said other pipelike leg portion at a location spaced inwardly from the closed free end thereof, said air supply pipe being disposed within substantially the same plane as said C-shaped member and extending outwardly therefrom in substantially transverse relationship to said other pipelike leg portion;

means associated with the other end of said air supply pipe for supplying cool air through said air supply pipe into said C-shaped member; and

an elongated log holding element associated with each of said pipelike leg portions and projecting upwardly therefrom for engaging the logs which are supported on said C-shaped element and for preventing the logs from rolling out of the fireplace, the elongated log holding elements being located on the pipelike leg portions in the vicinity of but spaced inwardly from the free ends thereof.

4,018,209

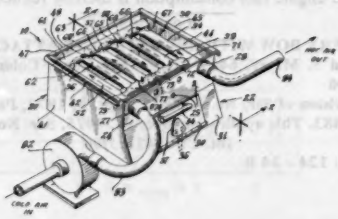
AIR HEATER

Gene Ferruccio Bonvicini, Morehouse Road, Easton, Conn. 06612

Filed Nov. 12, 1975, Ser. No. 631,369

Int. Cl.² F24B 7/04

U.S. Cl. 126—121 **5 Claims**



1. An air heater comprising a pipe assembly, said pipe assembly having an intake pipe defining an intake opening at one end, and an outlet pipe defining an outlet opening at one end, said pipe assembly providing a continuous air passageway between said intake opening and said outlet opening, means for horizontally supporting said pipe assembly, a protective sleeving removably attached to said pipe assembly, said sleeving having an open top and bottom and at least partially, vertically surrounding said pipe assembly when in place, said sleeving having a front plate, a rear plate and a pair of side panels, the upper portion of said front plate defining an intake pipe hole and an outlet pipe hole through which the front portion of said intake pipe and said outlet pipe outwardly protrude when said heater is assembled, said front plate having a plurality of vent holes and a centrally disposed door in its lower portion, said sleeving also having an outwardly projecting lip extending around a portion of its top edge, a means for heating said pipe assembly and a means for continuously forcing air into said intake opening and through said pipe assembly.

4,018,210

FORCED AIR CONVECTOR/HEATER FIREPLACE GRATE STRUCTURE

Reuben L. Christophel, Harrisonburg, Va., assignor to Shenandoah Manufacturing Company, Inc., Harrisonburg, Va.

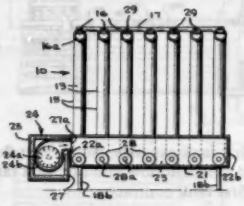
Filed Aug. 28, 1975, Ser. No. 608,740

Int. Cl.² F23H 13/00

U.S. Cl. 126—164 **4 Claims**

1. A forced-air room air convector and heating fireplace

grate structure, comprising a plurality of hollow curved metallic tubes of substantially C-shaped configuration disposed in side-by-side alined relation in parallel vertical planes rigidly assembled in an array defining a forward facing concave cradle structure to be placed in outwardly facing relation in a fireplace chamber and support solid fuel on lower leg portions of the cradle structure, the tubes being correspondingly shaped to each define a lower horizontal leg extending rearwardly from a forward air inlet end and rearwardly joining a rear upwardly extending leg which upwardly joins a forwardly extending top leg terminating in an air outlet opening spaced above the air inlet opening, an elongated duct manifold forming a plenum transversely spanning the array of hollow tubes adjoining the inlet ends of the tubes and in gaseous communication therewith, an air propelling fan means rigidly supported by the grate structure adjacent one end of the plenum within the fireplace chamber for withdrawing ambient air from a



room served by the fireplace and propelling the air into the plenum to pressurize the latter and provide a pressurized air supply to the inlet ends of the tubes for conveyance through the tubes in heat exchange relation to fire burning in the cradle structure and discharge the heated air in predetermined downwardly inclined paths back into the room, and means for directing along downwardly inclined paths the flow of heated air emerging from the outlet openings of the hollow tubes comprising a truncated oval baffle disc supported inside the open outlet end of each tube in a plane which extends through the horizontal diameter of the surrounding tube portion and is inclined downwardly and outwardly relative to the axis thereof with the curved edge portions of the disc which form the oval portion thereof engaging and joined to the inner surface of the associated hollow tube and the truncated edge thereof disposed substantially in a vertical plane alined with the outlet end of the associated tube.

4,018,211

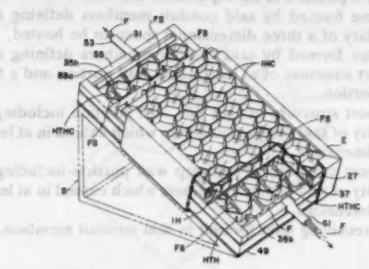
SOLAR ENERGY COLLECTION AND TRANSFER ARRANGEMENT AND METHOD, AND METHOD OF ASSEMBLY

Irwin R. Barr, Baltimore County, Md., assignor to AAI Corporation, Cockeysville, Md.

Continuation of Ser. No. 465,845, May 1, 1974, abandoned. This application July 9, 1975, Ser. No. 594,431
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 **141 Claims**

1. A solar energy collection and transfer arrangement, comprising,

a honeycomb panel sandwich assembly including a light-transmitting multicelled honeycomb insulation layer having light-transmitting top and bottom sheets with a light-transmitting honeycomb celled core extending in facial interconnection therebetween and a lateral fluid flow heat transfer multicelled honeycomb layer connecting with and extending laterally beneath said insulation layer, and a plurality of lateral fluid passageways formed in the cell walls of said heat transfer multicelled honeycomb layer for guiding and passing heat transfer fluid beneath the bottom sheet of said insulation layer to absorb solar



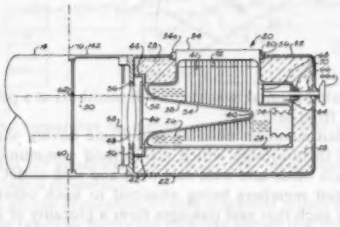
energy transferred thereto through said light-transmitting insulation layer.

4,018,212

SOLAR HEATING AND COOKING APPARATUS

Leopold A. Hein, Rte. 7, Fayetteville, Tenn. 37334, and William N. Myers, 4306B Boxwood Court, Huntsville, Ala. 35805

Filed Feb. 13, 1976, Ser. No. 657,820
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 **19 Claims**



10. A solar heating and cooking apparatus comprising:

a. a housing;

b. a heat transfer medium carried within said housing;

c. a radiation receiver carried by said housing in heat exchange contact with said heat transfer medium;

d. lens means for receiving and focusing a concentrated beam of solar radiation rays upon said radiation receiver;

e. a heat conductive surface carried by said housing in heat exchange relationship with said heat transfer medium for heating and cooking; and

f. control means for regulating the temperature of said heat conductive surface by regulating the distance between the level of said heat transfer medium and said heat conductive surface;

whereby solar energy impinging on said radiation receiver is effectively utilized to heat said heating and cooking surface.

4,018,213

SOLAR HEATING STRUCTURE

Harold J. Mann, Jr., 2120 Primrose, Fort Worth, Tex. 76111

Filed Apr. 5, 1976, Ser. No. 673,611
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **11 Claims**

1. Housing structure for employing solar heat for heating an enclosed space, comprising:

a plurality of conduit members attached to each other forming a frame adapted to be supported on the ground or the like in a position to be exposed to the sun,

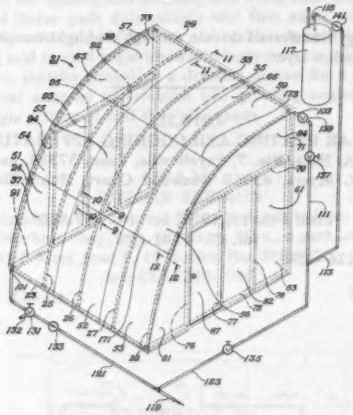
said frame formed by said conduit members defining the boundary of a three dimensional space to be heated,

said frame formed by said conduit members defining the support structure of at least a side wall portion and a top wall portion,

the support structure of said side wall position including a plurality of said conduit members which extend in at least two dimensions,

the support structure of said top wall portion including a plurality of said conduit members which extend in at least two dimensions,

a water receiving inlet formed in said conduit members,



a water outlet formed in said conduit members at a position spaced from said inlet,

said conduit members defining said frame having passages formed therethrough which are in fluid communication with each other and with said inlet and said outlet,

said conduit members being attached to each other in a manner such that said passages form a plurality of different water flow paths through said conduit members from said inlet to said outlet,

said conduit members being formed of the material which has good heat conductivity, and

panel means and supported by said conduit members in a manner to define said side wall portion and said top wall portion,

said panel means being formed of a material capable of transmitting therethrough heat and light from the sun.

4,018,214

HEATING AND VENTILATION SYSTEM

Norman B. Saunders, 15 Ellis Road, Weston, Mass. 02193

Division of Ser. No. 529,235, Dec. 3, 1974, Pat. No. 3,952,947.

This application Dec. 10, 1975, Ser. No. 639,304

Int. Cl.² F24J *3/02*

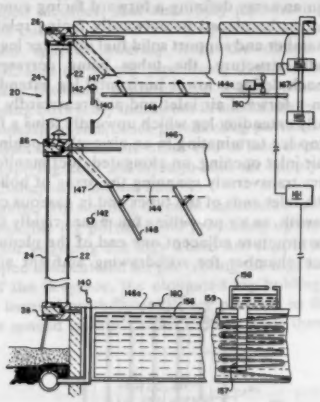
U.S. Cl. 126—271 **8 Claims**

1. In a building including at least one glazing panel for transmitting the light and near infrared heat energy of the sun, a system for storing said heat energy comprising in combination:

a first tank capable of being completely filled with a heat absorbing fluid and positioned relative to said glazing panel so as to be exposed to at least a portion of said heat energy transmitted through said glazing panel and so that said heat absorbing fluid absorbs at least a part of said portion of heat energy,

a second tank in fluid communication with said first tank and disposed above said first tank; and

conduit means connecting the bottom of said first tank and said second tank so that fluid disposed on the bottom of said first tank will flow into said second tank when the



fluid in said first tank expands, and so that fluid disposed in said second tank will flow into said first tank when the fluid in said first tank contracts.

4,018,215

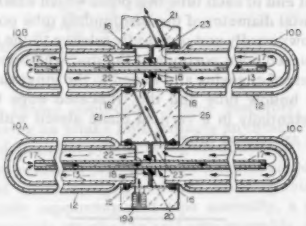
LIQUID OPERATED SOLAR ENERGY COLLECTOR

Yu K. Pei, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed July 28, 1975, Ser. No. 599,558

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **13 Claims**



1. In a solar energy collector apparatus, a manifold means interconnecting plural tubular solar energy collectors with each other in series,

said manifold means comprising:

a manifold receptacle for each of said plural tubular solar energy collectors of the apparatus,

said receptacle having an annular side wall providing a chamber having a mouth opening at one exial end,

an end wall means connected with said side wall closing the other axial end of said chamber,

a gasket seat on said side wall adjacent said one axial end,

an annular gasket in said seat,

an aperture in said end wall means,

an annular sealing gasket means encircling said aperture, and

a port in said side wall connected to the chamber;

each of said plural tubular solar energy collectors comprising a double-walled glass collector tube having a closed end and an open end, the open end of said collector tube being sealingly mounted in said mouth opening of a manifold receptacle by engagement with said annular gasket thereof,

an elongated, fluid connecting tube extending through said

sealing gasket means and into the interior of a double-walled collector tube, the one end of said fluid connecting tube being disposed adjacent the closed end of said collector tube, a heat exchange fluid, and a fluid conducting means connecting the other end of said fluid connecting tube and the side wall port of another receptacle such that said fluid is adapted for circulation (1) through the plural tubular solar energy collectors in series, and (2) in a reverse flow path within each of said tubular collectors.

4,018,216

HEAT EXCHANGE APPARATUS

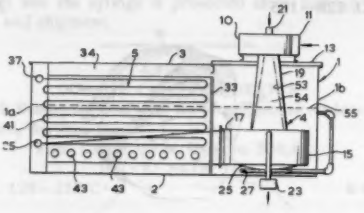
John Thurley, Harrogate, England, assignor to John Thurley Limited, England

Filed Apr. 21, 1975, Ser. No. 569,653

Claims priority, application United Kingdom, Apr. 29, 1974, 18629/74

Int. Cl.² F24H *1/20*

U.S. Cl. 126—360 R **13 Claims**



1. Heat exchange apparatus for raising the temperature of a subject fluid comprising:

A. a fuel burner including:

a. an upper tangential air inlet;

b. a lower combustion products outlet;

c. a portion, lying between the air inlet and the combustion products outlet, where combustion takes place and comprising a frusto-conical duct extending downwardly from the air inlet and opening at its lower end into a chamber, the combustion products outlet extending tangentially from the chamber;

d. a fuel inlet, at least the combustion portion being located in a container, and at least part thereof being, in use, immersed in a coolant liquid;

B. fluid passage means, laterally spaced from the fuel burner, through which a subject fluid may be passed, the fluid passage means being located in a vessel and, in use, at least partially immersed in a heat-exchange fluid;

C. means for feeding heated combustion products from the combustion products outlet to a position below said fluid passage means, and, at this position, releasing the combustion products into the heat exchange fluid.

4,018,217

ARM AND HAND REST DEVICE FOR MICROSURGERY

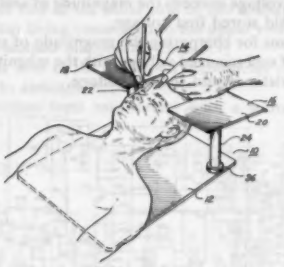
Daniel R. Evans, 2005 Valparaiso St., Valparaiso, Ind. 46384

Filed Nov. 20, 1975, Ser. No. 633,616

Int. Cl.² A61B *19/00*; B68G *5/00*

U.S. Cl. 128—1 R **6 Claims**

1. An arm and hand rest device for performing microsurgery on a patient lying on an operating table, comprising a horizontally disposed board for insertion between the patient's body and the operating table for retaining the device in a desired position with relation to the patient's body, a first table mounted on one end of said board and projecting upwardly therefrom and having an arm and hand rest at the top located in a position in close proximity to the patient's head when the operation is being performed, a second table mounted on said board in spaced relation to said first mentioned table and having an arm and hand rest at the top and, with the first table, defining an area for the patient's head, and means for vertically adjusting said tables to different levels relative to one another.



4,018,218

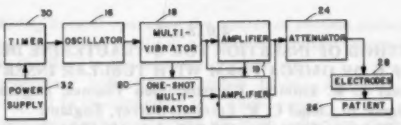
METHOD AND APPARATUS FOR SLEEP INDUCTION

James E. Carlson, 9233 Carthay Circle, Spring Valley, Calif. 92077, and Robert E. Urmston, 4405 Niagara Ave., San Diego, Calif. 92107

Filed Mar. 12, 1975, Ser. No. 557,593

Int. Cl.² A61N *1/34*

U.S. Cl. 128—1 C **23 Claims**



1. An apparatus to induce sleep in a patient which comprises:

means for generating electrical cycle pulses having a basic control frequency,

first means responsive to said electrical pulses for generating reticular formation stimulus signals that are first in the cycle,

second means for generating visual stimulus signals that are second in the cycle,

third means for generating recovery signals that are third in the cycle,

and electrode means for transmitting the cycle of signals to the patient.

4,018,219

HEART RATE VARIABILITY MEASUREMENT

George Hojaiban, Newington, Conn., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,084

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 A **15 Claims**

1. Apparatus for measuring heart rate variability comprising

means for receiving periodic voltage signals each having a characteristic with a magnitude proportional to a subject's heart rate,

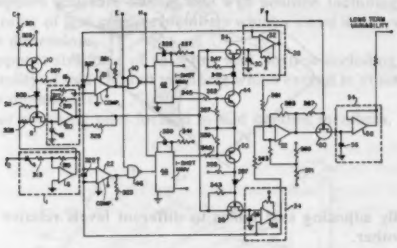
means for storing a first voltage having a characteristic with a magnitude proportional to the previous maximum heart rate of the subject,

means for storing a second voltage having a characteristic with a magnitude proportional to the previous minimum heart rate of the subject,

first means for comparing the magnitude of said characteristic of said received voltage with the magnitude of said characteristic of said first voltage,

means responsive to said first comparing means for storing said received voltage in said first voltage storing means only when the magnitude of said characteristic of said received voltage exceeds the magnitude of said characteristic of said stored first voltage,

second means for comparing the magnitude of said characteristic of said received voltage with the magnitude of said characteristic of said second voltage,



means responsive to said second comparing means for storing said received voltage in said second voltage storing means only when the magnitude of said characteristic of said received voltage is less than the magnitude of said characteristic of said second voltage, and

means for determining the difference between the magnitudes of said characteristics of said first and second voltages respectively.

4,018,220

METHOD OF INSERTION FOR INTRAUTERINE DEVICE OF C OR OMEGA FORM WITH TUBULAR INSERTER

Lionel C. R. Emmett, Kingston-upon Thames, England, assignor to Lionel C. R. Emmett, Surrey, England

Division of Ser. No. 489,982, July 19, 1974, Pat. No. 3,973,560. This application Feb. 23, 1976, Ser. No. 660,679

Int. Cl.² A61F *5/46*

U.S. Cl. 128—130 **7 Claims**

1. A method of inserting an intrauterine contraceptive device into the fundal region of the uterine cavity, using the device and an inserter, the device being a linear type of intrauterine contraceptive device made of flexible material comprising an elongate member which, prior to placement in the inserter and in situ, assumes a linear arch-shape wherein the two terminal portions of the linear form are connected by a non-interrupted continuous arch form, and the terminal portions curve inwardly toward each other and the member being of a material with sufficient flexibility to assume a substantially straight linear form when placed inside the inserter to accommodate insertion, and after expulsion from the inserter to assume the arched, in situ, configuration, which has dimensions substantially encompassing an area enabling the device to be contained within a normal uterus; and the inserter being a hollow tube of sufficient internal diameter to accommodate the device in its substantially straightened out configuration comprising the steps of: substantially straightening the member and inserting it into the hollow tube; inserting the tube through the cervical canal a predetermined distance whereupon the inserted end of the tube is space from the fundal roof a distance at least equal to the depth dimension of the device in its arched configuration; pushing the device from the tube into the fundal cavity; maintaining the extruding end of the device at a fixed distance, slightly spaced from the end of the hollow tube, to cause the body of the device to positively curve into the arched configuration laterally along the facing walls of the fundal cavity until the device is completely pushed from the hollow tube; positively bringing both ends of the device into close juxtaposition and shifting the device in its substantially in situ configuration to a proper location in the fundal cavity; and removing the hollow tube.

4,018,221

SUPPORT FOR ANESTHETIC GAS DELIVERY HOSES AND ENDOTRACHEAL TUBES

Thomas Rennie, 335 Dewey St., Bennington, Vt. 05201

Filed Sept. 29, 1975, Ser. No. 617,716

Int. Cl.² A61M *25/02*

U.S. Cl. 128—185 **2 Claims**

1. A medical band for supporting endotracheal tubes and anesthesia hoses from the forward head portion of a patient, said band comprising an elongated flexible strap of predetermined width, said strap including opposite end portions and being of a length to encircle substantially one and one-half times about a patient's head, one terminal end portion of said strap including a first Velcro strip on one side facing outwardly therefrom, the other end portion of said strap including a second Velcro strip on the other side thereof facing outwardly thereof and spaced from the corresponding terminal end portion, said first and second strips being releasably engageable with each of adjusted end overlapped positions of said one terminal end portion and said other end portion, a thick, arcuate and somewhat deformable but shape retentive pad secured over and extending along said other side of said strap between said second fastening means and said terminal end of said other end of said strap and over which the zone of said one end portion of said strap spaced along the latter from said one terminal end portion may be lapped, said zone of said one end portion and the opposition surfaces of said pad define opposing friction surfaces between which anesthetic gas delivery hoses may be clamped.

4,018,222

SYRINGE CONTAINING FROZEN VACCINE

William J. McAleer, Ambler, and Maurice R. Hilleman, Lafayette Hill, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 548,467, Feb. 10, 1975. This application May 13, 1975, Ser. No. 577,244

Int. Cl.² A61M *5/00*

U.S. Cl. 128—216 **11 Claims**

1. A vaccine delivery system suitable for human administration comprising a single dosage hypodermic syringe having a container portion made of a plastic material which is resiliently flexible at room temperature and a needle portion comprising a hollow sharp needle extending from the plastic container portion to convey fluids from within the container out

through the tip of the needle when the needle is inserted under the skin and the container is squeezed, an aqueous vaccine diluted to a concentration suitable for human administration and sealed within the container, the vaccine being in the

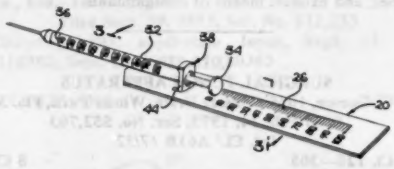
frozen state at a temperature of from about −10° C to about −20° C, whereby the vaccine is preserved for storage and shipment and the syringe is protected from leakage during storage and shipment.

4,018,223

DOSAGE CONTROL DEVICE

Gayle M. Ethington, Postville, Iowa, assignor to Andros Incorporated, Berkeley, Calif.

Filed Dec. 9, 1974, Ser. No. 530,811
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 C **6 Claims**



1. A combination for use in controlling the dosage of injections comprising: a syringe having a cylinder body with a needle on one end and at least one cylinder flange on the other end, and a plunger extending into said cylinder body and having a plunger flange on the outer end thereof; and a sheet-like plastic member of generally uniform thickness having a scale for reading in co-operation with the plunger flange and having a slot at a predetermined location with respect to said scale and snapped over said cylinder flange such that said cylinder flange protrudes through said plastic member, said plastic member being cut off at the scale reading for the desired dosage at a position less than the full travel of said plunger flange, whereby said plunger may be moved so that said plunger flange abuts the end of said member, as cut off, to control the dosage in said syringe.

4,018,224

UNDERWATER DRAINAGE DEVICE WITH DUAL COLLECTION CHAMBERS

Leonard D. Kurtz, Woodmere, and Robert E. Bidwell, Melville, both of N.Y., assignors to Deknatel, Inc., Long Island, N.Y.

Filed Apr. 7, 1976, Ser. No. 674,482
Int. Cl.² A61M *1/00*
U.S. Cl. 128—276 **6 Claims**

1. An underwater drainage device comprising, in combination,

a main collection chamber

having an inlet adapted to be connected to a pleural cavity,

an outlet from the main collection chamber,

a U-shaped water seal chamber

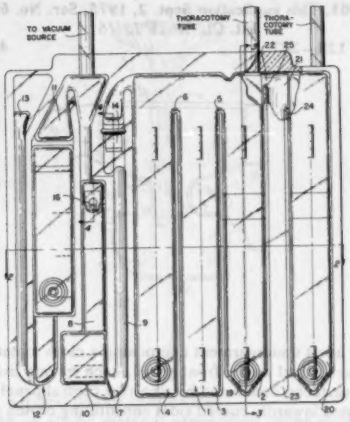
a U-shaped manometer chamber,

the upper end of one arm of the U-shaped water seal chamber being connected to the outlet from the main collection chamber,

the upper end of the other arm of the U-shaped water seal chamber being connected to the upper end of one arm of the U-shaped manometer chamber,

the other arm of the U-shaped manometer chamber being open to atmosphere,

a connection from said device with a source of suction,



during normal operation the source of suction maintaining the pleural cavity at a negative pressure determined by the fluid in the manometer chamber,

a secondary collection chamber having another inlet adapted to be connected to a plural cavity,

a passageway interconnecting the main collection chamber and the secondary collection chamber,

and an overflow chamber being disposed between the secondary collection chamber and the main collection chamber.

4,018,225

CATAMENIAL TAMPON

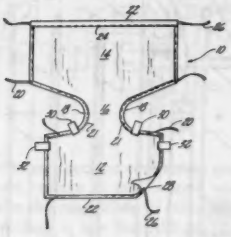
Stelio Jack Elmi, Andover, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Aug. 18, 1975, Ser. No. 605,427
Int. Cl.² A01F *13/20*
U.S. Cl. 128—285 **5 Claims**

1. A catamenial tampon comprising a hollow cone of absorbent material, said cone being adapted so that the open end of the cone which is the insertable end will face the posterior of the vagina when inserted, a withdrawal cord attached to the outside of the apex at the retrievable closed end of the cone and the walls of the insertable open end of the cone being

furled outwardly and down to form a cuff which covers a portion of the outer walls of said cone, said cuff providing a tighter fit with the vaginal walls when the tampon is in position and said cuff unfurling upon removal to ease said removal.

4,018,226
ADULT UNDERGARMENT
Dorothy Korgemets, 9333 E. Jefferson, Detroit, Mich. 48214
Division of Ser. No. 400,550, Sept. 25, 1973, Pat. No. 3,916,901. This application Sept. 2, 1975, Ser. No. 609,792
Int. Cl.² A61F *13/16*
U.S. Cl. 128—287 **4 Claims**



1. An adult undergarment comprising a cloth material having a back panel and a front panel, each having inside and outside surfaces, connected by a narrow central panel defined by opposed inwardly curved sides constituting crotch portions and convergent end sections disposed along the lower edges of said panels and constituting pant leg portions;

channels extending along the length of the crotch portions, the convergent end sections and along the width of said front and back panels at the outer edges thereof, the channels of the leg portions and the outer edge of the front panel opening to said outside surface of said front panel at locations which are inwardly spaced from the side edges of said front panel, the channels of the leg portions and of the outer edges of the rear panel opening to the side edges of said rear panel, said entire front panel from side edge to side edge being smaller than said back panel; and

tie cords movably carried within each of said channels, the ends of said tie cords existing from said openings, whereby portions of said back panel overlap portions of said front panel when said garment is worn and the ends of said tie cords are fastened together.

4,018,227
CRYOSURGICAL INSTRUMENT
Ronald M. Wallach, Norwalk, Conn., assignor to Cryomedics, Inc., Bridgeport, Conn.
Filed Oct. 9, 1975, Ser. No. 621,105
Int. Cl.² A61B *17/36*
U.S. Cl. 128—303.1 **13 Claims**

1. A cryosurgical instrument comprising:

means defining an expansion chamber, said means including a body formed of a high thermal conductivity material and having a surface thereof shaped for contacting body tissue and providing heat transfer with the tissue,

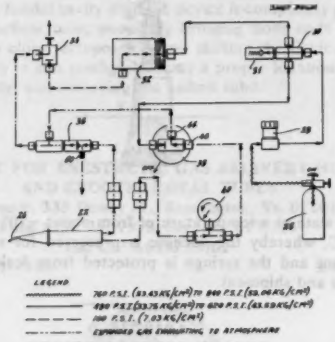
refrigerant supply means for conveying a gaseous refrigerant under pressure from a source to said expansion chamber, said means including

flow restriction means adjacent said chamber for providing an appropriate pressure differential as said pressurized gas passes therethrough to cause a Joule-Thomson expansion of said gas to cool said chamber,

selectively operable pressure regulation means for reducing the pressure of said gaseous refrigerant below that required to effect said Joule-Thomson expansion of said gas prior to its entrance into said expansion chamber, and

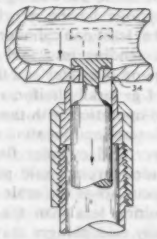
selectively operable exhaust means for conveying an effluent gas from said chamber to the atmosphere,

whereby with said pressure regulation means in its inoperative mode and said exhaust means in its operative mode, said gas can expand into said chamber and exhaust to the atmosphere to effect rapid cooling of said chamber; with said pressure regulation means in its inoperative mode and said exhaust means in its inoperative mode,



said gas flow to the atmosphere can be interrupted thereby effecting rapid warming of said chamber; and with said pressure regulation means in its operative mode and said exhaust means in its operative mode said gas will not undergo a Joule-Thomson expansion but will flow through and purge said refrigerant supply means, chamber, and exhaust means of contaminants.

4,018,228
SURGICAL PUNCH APPARATUS
Carl C. Goosen, 1035 Golfside Drive, Winter Park, Fla. 32789
Filed Feb. 24, 1975, Ser. No. 552,703
Int. Cl.² A61B *17/32*
U.S. Cl. 128—305 **8 Claims**



1. A surgical punch apparatus comprising in combination:

an elongated hollow support sleeve having two end portions;

a removably attached annular cutter blade attached to one end portion of said elongated hollow support sleeve and having an axial passage therethrough;

an elongated rod slidably mounted in said hollow support sleeve;

a movable cutter blade fixedly attached to one end of said elongated rod and slidable with said rod in said sleeve, said movable cutter blade being disc-shaped with an annular cutting edge and shaped to slide into the passage in said removably attached cutter blade;

handle means attached to said elongated rod and extending through openings in said elongated hollow support sleeve for sliding said rod;

threaded blade holding member on the end of said elongated hollow support sleeve for holding said removably

attached cutter blade to said elongated hollow support sleeve;

said removably attached cutter blade having an annular ledge wrapped around the exterior thereof and said threaded blade holding member having an interior annular ledge therein whereby the interior ledge of the threaded blade holding member will abut against the annular ledge of the blade for holding the blade to the hollow support sleeve;

said elongated hollow support sleeve having a raised annular portion therein having substantially the same interior cross-section diameter as said removably attached cutter blade and said elongated rod being slidably supported on said raised annular portion and said removably attached cutter blade; and

a cap attached to the opposite end of said elongated hollow support sleeve from said threaded blade holding member and a spring located between said cap and said elongated rod in said elongated hollow support sleeve, whereby said fixed cutter blade can be inserted in a cut and pulled into said removably attached cutter blade to a cut a predetermined section in tissue.

4,018,229

APPARATUS FOR LIGATION OF AFFECTED PART IN COELOMA

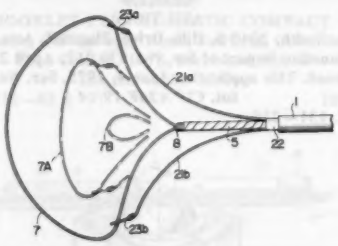
Osamu Komiya, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sept. 10, 1975, Ser. No. 612,253

Claims priority, application Japan, Sept. 13, 1974, 49-110382; Sept. 13, 1974, 49-110383

Int. Cl.² A61B *17/12*

U.S. Cl. 128—326 **9 Claims**



1. An apparatus for ligation of an affected part in coeloma comprising a ligature having a loop formation which is adapted to form a loop for ligating an affected part in an coeloma, the loop being reduced in size by pulling one end of the loop formation; an inner flexible tube into which said one end of the ligature extends; a pair of holding wires each having one end mounted on a distal end portion of the inner tube and having a free end formed as a capture for releaseably engaging the loop formation, the captures being effective to retain the loop formation therein below a given level of tension in the loop formation; and an outer flexible tube for internally housing the loop formation, the holding wires and the inner flexible tube in compacted condition; said outer flexible tube adapted for insertion into a coeloma, the outer tube being adapted to be operated for displacement in a direction to expose the loop formation and the holding wires into the coeloma, the holding wires being resiliently biased in a manner such that their respective captures are effective to extend the loop formation into a loop of an increased size when it is exposed while maintaining engagement with the captures.

4,018,230

CERVICAL DILATOR

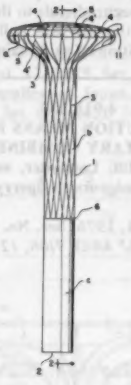
Kazuo Ochiai, No. 35-7, 1-chome, Nishiikebukuro, Toshima, Tokyo, and Masayasu Mizutani, No. 7-3-19, Koyama, Shinagawa, Tokyo, both of Japan

Filed Apr. 2, 1975, Ser. No. 564,346

Claims priority, application Japan, Apr. 4, 1974, 49-038386

Int. Cl.² A61M *29/00*

U.S. Cl. 128—344 **12 Claims**



1. A cervical dilator comprising:

a sack of elastic material expandable under internal pressure, said sack comprising a shaped head and a stem communicating with the head, said head terminating in flat, generally disc-like surface, and

a network of interconnected inelastic members embedded in portions of said material,

said inelastic members being configured to define the shape and limit the size of said sack during expansion under said internal pressure.

4,018,231

DISPOSABLE BALLOON TYPE CATHETER

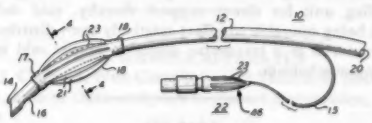
Dean R. Wallace, Fort Myers, Fla., assignor to Airco, Inc., Montvale, N.J.

Continuation-in-part of Ser. No. 436,314, Jan. 24, 1974, Pat. No. 3,901,246. This application June 2, 1975, Ser. No. 583,314

The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.

Int. Cl.² A61M *25/00*

U.S. Cl. 128—351 **6 Claims**



1. A tracheal tube adapted for insertion into the trachea of a patient for introducing and removing gas, said tube having a main inflatable chamber surrounding the distal end thereof, a gas passageway having one end communicating with the interior of said main inflatable chamber and having the other end adapted to receive an inflating means for delivering gas to inflate said main inflatable chamber; said gas passageway including a valve means for selectively introducing gas through said passageway to said inflatable chamber and a pilot balloon means comprising a tubular extension, a flexible oval-shaped pilot balloon having its outer ends secured to said tubular extension, thereby forming an enclosed pilot chamber;

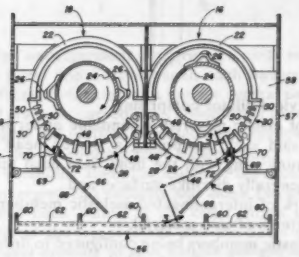
said pilot chamber being in gas communication with said main inflatable chamber through said gas passageway and an opening provided in said tubular extension; and said flexible pilot balloon being secured to said tubular extension in a prestretched condition along its length, whereby said balloon is characterized in a non-inflated condition by a series of spaced folds extending longitudinally between said secured ends, and is substantially free of transversely oriented folds, the ridges of said longitudinal folds contrasting with the troughs between said folds to constitute a series of spaced visually discernible markings between said secured ends to thereby visually signal said non-inflated condition of said balloon and the corresponding inflation condition of said main chamber.

4,018,232

MATERIAL DISTRIBUTION MEANS FOR CONCAVE OF ROTARY COMBINE

Edward W. Rowland-Hill, Lancaster, and Robert R. Todd, Leola, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Apr. 1, 1976, Ser. No. 672,582
Int. Cl.² A01F *7/06, 12/00*
U.S. Cl. 130—27 T **17 Claims**



1. A mobile combine having a longitudinally extending unit comprising threshing and separating means and including coacting rotor and concave members, crop feeding means on the forward end of said combine operable to deliver cut crop material to said threshing and separating means, material cleaning mechanism comprising a grain pan supported below said threshing and separating means to receive threshed and semi-threshed material therefrom and sieve mechanism supported by said combine rearwardly of said grain pan to receive material therefrom for separation of threshed crop material from waste material, and power means operable to actuate said feeding means and threshing means; the improvement comprising material deflecting means positioned beneath at least portions of said threshing and separating means, and means connecting said deflecting means to said longitudinally extending unit for direct support thereby, said deflecting means being operable to effect relatively even distribution of crop material in a transverse direction across said material cleaning mechanism.

4,018,233

SHAPED MATTERS OF TOBACCOS AND PROCESS FOR PRODUCING THE SAME

Toshio Miyake, Okayama, Japan, assignor to Sumitomo Chemical Company Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, Okayama, both of, Japan

Filed June 16, 1975, Ser. No. 587,167
Claims priority, application Japan, June 29, 1974, 49-14829
Int. Cl.² A24B *15/04, 15/05, 3/14*
U.S. Cl. 131—17 AC **6 Claims**

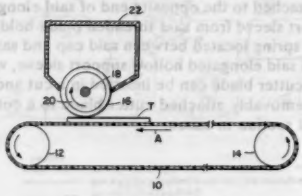
1. A shaped solid smoking composition, the smoke produced by its combustion being pleasant in aroma and flavor, which composition comprises starting tobacco materials coated with and coated together with a material selected from the group consisting of pullulan, etherified pullulan, and esterified pullulan.

4,018,234

MECHANICAL LIPID REMOVAL FROM TOBACCO LEAVES

Joseph V. Fiore, Fairfield, Conn., assignor to AMF Incorporated, White Plains, N.Y.

Filed Mar. 6, 1975, Ser. No. 556,025
Claims priority, application United Kingdom, Mar. 8, 1974, 10470/74
Int. Cl.² A24B *3/18, 15/00*
U.S. Cl. 131—140 B **7 Claims**



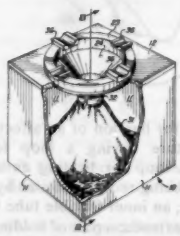
1. A process for the selective removal of surface lipids from tobacco leaves comprising contacting the epithelium of whole tobacco leaf in a supple supported condition at a moisture condition of at least 35 percent by weight with means for mechanical disengagement and release of surface lipids associated with the glandular trichome and cuticle, comprising an absorbent surface said contacting being effected in a nonabrasive manner without substantial relative movement between said leaf and said surface and recovering tobacco leaf characterized by substantial retention of physical and chemical integrity and a lipid content reduced as compared to untreated leaf by at least 25%.

4,018,235

ASH TRAY

April A. Smith, 2040 S. Hills Drive, Flagstaff, Ariz. 86001

Continuation-in-part of Ser. No. 570,012, April 21, 1975, abandoned. This application June 4, 1975, Ser. No. 583,757
Int. Cl.² A24F *19/14*
U.S. Cl. 131—236 **2 Claims**



1. An ash tray for receiving and extinguishing ashes and butts for providing for convenient and sanitary disposal of the smokers' waste accumulated therein, said ash tray comprising:

a. an upright hollow vessel having an opening in the top thereof for receiving smokers' waste therethrough;

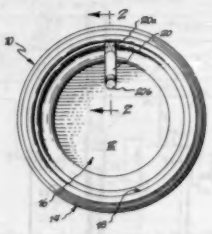
b. a disposable flexible receptacle detachably supported within said vessel and communicating with the opening in the top thereof for receiving said smokers' waste therein; and

c. means for contacting smokers' waste contained in said disposable receptacle with a fire-extinguishing fluid,

said disposable receptacle being fluid-permeable and detachably supported within said vessel such that at least the lower

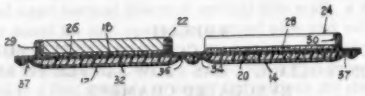
portion thereof is suspended within a firek-extinguishing fluid contained within the lower portion of said vessel.

4,018,236
ASH TRAY
Albert E. Ehlen, 539 Linwood Ave., Buffalo, N.Y. 14209
Filed Mar. 17, 1976, Ser. No. 667,635
Int. Cl.² A24F *15/08, 19/00*
U.S. Cl. 131—240 R **12 Claims**



1. In an ash tray having an upwardly opening ash receiving chamber circumscribed by a rim, said rim having at least one support portion adapted to support a cigarette when not being held by a smoker, the improvement wherein said support portion defines a slot inclined upwardly and inwardly towards said chamber, said slot including a pair of facing side wall surfaces disposed respectively relatively adjacent to and remote from said chamber, said side wall surfaces being spaced to frictionally receive therebetween a butt end of said cigarette whereby to position said cigarette to upstand from within said slot with an ash end thereof arranged to overlie said chamber, and said slot having a length as measured in a direction circumscribing said chamber in excess of the distance between said side wall surfaces.

4,018,237
BOOKLET TYPE COSMETIC COMPACT
Wolf Steiman, 649 Springer Road, Fairfield, Conn. 06430
Filed Oct. 14, 1975, Ser. No. 622,026
Int. Cl.² A45D *33/00*
U.S. Cl. 132—83 R **10 Claims**



1. As a new article of manufacture, a cosmetic compact in the form of a small booklet which includes a single outer piece of tough, flexible sheet material, said booklet having front and rear cover portions and comprising:

a. a base member of flexible and soft sheet-like material,

b. a cover member of flexible and soft sheet-like material hingedly connected to and adapted to overlie the base member,

c. a substantially flat retainer sheet carried by one of said members, said sheet having an upstanding yieldable bead formation extending at least around three peripheral side edge portions thereof,

d. means for securing said retainer sheet to said one member,

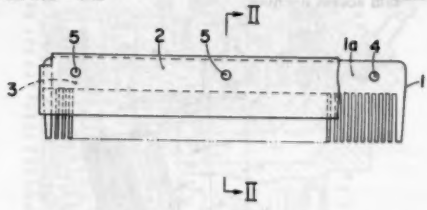
e. a second substantially flat retainer sheet carried by the other of said members, said second sheet having an upstanding yieldable bead formation extending at least partially around its periphery, and

f. means for securing said second retainer sheet to said other member,

g. said bead formations being adapted to overlie and frictionally engage and nest with one another when the cover member is swung to a closed position overlying the base member, thereby to maintain the members in the closed position when the compact is not in use,

h. said base member and cover member being formed of a single sheet whereby they are integral with one another, said single sheet having intermediate portions constituting a "living" hinge.

4,018,238
COMB
Nobuaki Ishida, 9-24-6 Koganehara, Matsudo, Chiba, Japan
Filed Sept. 22, 1975, Ser. No. 615,434
Claims priority, application Japan, July 4, 1975, 70-46670
Int. Cl.² A45D *24/08*
U.S. Cl. 132—143 **1 Claim**



1. A device for simultaneously combing and smoothing the hair which consists of

a. a comb member that includes

1. an elongated non-tooth body portion,
2. a plurality of spaced apart teeth extending in a parallel row downwardly from said elongated body portion, and
3. a plurality of longitudinally aligned indentations along one side of said nontooth body portion, and

b. a cover member that includes

1. an elongated generally U-shaped portion that fits over and along the edge of the elongated non-tooth portion of the comb member that is farthest from the teeth of the comb, and
2. an elongated generally flat section extending from said U-shaped portion downwardly over a substantial portion of the teeth of the comb member but short of the ends of the teeth so as to leave exposed the outer end portions of all of said comb teeth,
3. a plurality of generally rectangular openings in said elongated flat section which are large enough to expose large areas of said teeth and permit the passage of hot air to the hair beneath the teeth of the comb, and
4. a plurality of longitudinally aligned protrusions along the interior surface of said U-shaped portion, said protrusions being spaced apart so as to engage said indentations located on said non-tooth body portion.

4,018,239
TRAY WASHER APPARATUS
Frank J. Caldwell, West Carrollton, and Thomas B. Heckman, Troy, both of Ohio, assignors to Hobart Corporation, Troy, Ohio
Filed Nov. 17, 1975, Ser. No. 632,869
Int. Cl.² B08B *3/02*
U.S. Cl. 134—143 **5 Claims**

1. A machine for washing upright articles which are of greater height than width dimensions when supported by an article-receiving rack, comprising:

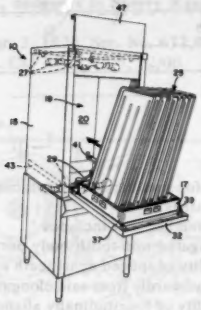
a cabinet of generally rectangular horizontal cross-section capable of accommodating the horizontal dimensions of a rack, said cabinet enclosing and defining a washing chamber and also defining a front access opening of height and width capable of accommodating lateral, unobstructed movement of a rack containing said upright articles therethrough into said washing 10 chamber,

spray apparatus in said washing chamber above and below said access opening for spraying wash solution and rinse water onto articles in said washing chamber,

horizontal rack receiving tracks in said chamber 15 extending to positions adjacent the sides of the lower edge of said access opening,

a lower door pivotally mounted on said cabinet adjacent to the lower edge of said access opening for movement from a first vertical, closed position in which said lower door covers a lower portion of said access opening to a second horizontal, open position uncovering said lower portion of said access opening, said lower door including a rack supporting surface means, and said door dimensioned to correspond in size to said rectangular horizontal cross-section of said cabinet,

guide track members mounted above said lower door and extending vertically upward therefrom along the sides of said access opening,



an upper door mounted for vertical sliding movement along said guide track members from a first lower position covering the remaining upper portion of said access opening to a second upper position uncovering said upper portion of said access opening, and

means interconnecting said upper door and said lower door and coordinating the movement of said upper door and said lower door between their respective first and second positions, such that a large access opening is provided permitting a rack resting on said lower door and loaded with the upright articles to be moved horizontally onto said rack receiving tracks in said washing chamber when said upper door means and said lower door means are in their respective second positions, and further said access opening is completely covered when said upper door means and said lower door means are in their respective first positions.

4,018,240

BRUSH CLEANING DEVICE

John W. Palthe, Roseville, Minn. 55113

Filed Apr. 28, 1975, Ser. No. 572,157

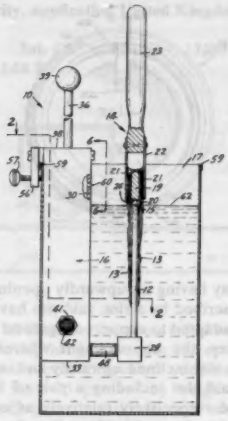
Int. Cl.² B08B *3/02*

U.S. Cl. 134—196 **10 Claims**

1. A device adapted for applying solvent to clean a paint or varnish brush of the conventional type having an elongate divider wedge and a multiplicity of bristles attached around the sides of said divider wedge and projecting a generally uniform predetermined distance in the same direction from the divider wedge to define a brush tip, the thickness and length of the divider wedge causing an elongate opening adjacent the wedge between walls of the bristles projecting from opposite sides of the wedge, said device comprising:

at least one nozzle comprising a tubular wall defining a central opening, having an open end, a closed terminal end opposite said open end, and a plurality of circumferentially spaced radial openings through said tubular wall communicating with said central opening and positioned closely adjacent said terminal end, said nozzle having a transverse thickness adjacent said terminal end adapted to afford insertion of the terminal end of said nozzle into the opening between the walls of bristles in a said brush; and

means coupled to the open end of said nozzle adapted for



passing a said solvent under pressure through the central opening and out through the radial outlet openings of the nozzle so that with the terminal end of said nozzle inserted in the opening between the walls of bristles of a said brush adjacent its divider wedge, solvent passing through the outlet openings of the nozzle will be directed transversely outwardly through the bristles of the brush adjacent its divider wedge to thoroughly clean the bristles.

4,018,241

METHOD AND INLET CONTROL SYSTEM FOR CONTROLLING A GAS FLOW SAMPLE TO AN EVACUATED CHAMBER

Ingvar E. Sodal; Lars Hoivik, both of Boulder; Alexander J. Micco; John V. Weil, both of Denver, and Norman W. Baer, Boulder, all of Colo., assignors to The Regents of the University of Colorado, Boulder, Colo.

Division of Ser. No. 508,452, Sept. 23, 1974, Pat. No. 3,926,209, which is a division of Ser. No. 355,792, April 30, 1973, Pat. No. 3,895,231. This application Oct. 3, 1975, Ser. No. 619,441

Int. Cl.² F16K *31/02*

U.S. Cl. 137—14 **8 Claims**

1. A method for maintaining constant gas pressure in an evacuated chamber of minute total volume, said method comprising the steps of:

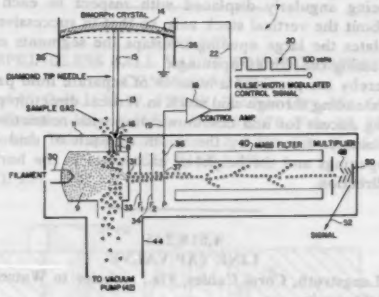
injecting gas through an inlet of small diameter,

directing a beam of ions from an ion source through the injected stream of gas at a point just below the inlet in the chamber,

detecting the amount of ions at a point opposing the ion source and near the inlet, the amount of ions detected being proportional to the pressure of the chamber,

generating an electrical signal in response to the sensed

pressure, the strength of the electrical signal varying with the amount of ions detected, and

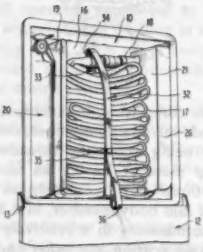


occluding the inlet at which the gas is injected in response to the strength of the electrical signal.

4,018,242
FIRE HOSE CABINET

Herold M. Schlegel, 2812 Fernwood, Ann Arbor, Mich. 48104

Filed Dec. 1, 1975, Ser. No. 636,712
Int. Cl.² A62C *35/20*
U.S. Cl. 137—355.18 8 Claims



1. A household fire-fighting station comprising a cabinet body adapted for mounting in a wall opening and having a forward open vertical side and vertical side walls, a movable closure panel for said open side, a stand pipe and valve positioned in the cabinet body near one vertical side wall thereof, a hinged substantially L-shaped guard within the cabinet body adapted in a first position to cover and enclose the stand pipe and valve and in a second position to expose the stand pipe and valve, spring means connected with said guard biasing it to said second position, said cabinet body having a fire hose storage compartment, a fire hose coupled with said valve and adapted to be folded in vertically stacked layers within said storage compartment, and manually releasable retainer means holding said fire hose in said compartment with the fire hose engaging said guard and holding it in said first position against the force of said spring means.

4,018,243
ADJUSTABLE CHECK VALVE FOR USE IN AN OXYGEN REGULATOR

Jack E. Dunbar, Davenport, Iowa, assignor to The Bendix Corporation, South Bend, Ind.

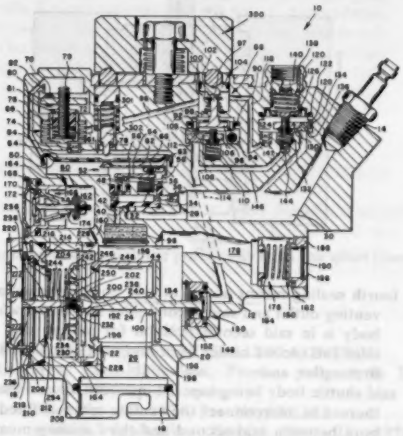
Filed Dec. 8, 1975, Ser. No. 638,254
Int. Cl.² A62B *9/00*
U.S. Cl. 137—81 10 Claims

1. In an oxygen regulator having a housing with a first inlet port connected to oxygen under pressure, a second inlet port connected to receive air at atmospheric pressure from an atmospheric chamber and an outlet port for supplying a fluid mixture to a breathing apparatus, control means for regulating the relationship between said oxygen under pressure and said air at atmospheric pressure in said fluid mixture as a function of altitude, said control means comprising:

oxygen valve means located in said housing between said first inlet port and said outlet port for regulating the rate of flow of oxygen therebetween;

air valve means located in said housing between said second inlet port and said outlet port for regulating the rate of flow of air therebetween;

linkage means connecting said oxygen valve means with said air valve means for proportionally increasing the restriction of one of said oxygen valve means and said air valve means with a decrease in the restriction of the other of said oxygen valve means and said air valve means;



regulating means connected to said linkage means for controlling said restriction of said oxygen valve means and said air valve means as a predetermined function of oxygen inlet pressure;

sensing means responsive to altitude for allowing said linkage means to move to a position in which said air vave means is closed and said oxygen valve means is opened to allow said oxygen under pressure to flow to said outlet port;

check valve means located in said atmospheric chamber for preventing said mixture from being communicated to the atmosphere prior to the closure of said air valve means; and

adjustment means connected to said check valve means for establishing limits at which air at atmospheric pressure is admitted to said atmospheric chamber.

4,018,244
AUTOMATIC SWITCHOVER VALVE AND SYSTEM UTILIZING SAME

James A. Burns, Lake Elmo, Minn., assignor to Airco, Inc., Montvale, N.J.

Filed Sept. 10, 1975, Ser. No. 612,136
Int. Cl.² F16K *11/07*; G05D *11/00*
U.S. Cl. 137—113 6 Claims

1. An automatic switchover valve for changing from a relatively depleted to a fully pressurized gas supply, comprising:

a valve housing having a bore extending between opposed ends thereof, first and second inlets at opposite ends of said bore for connection to alternate gas supply sources, and first and second outlets extending transverse to said bore intermediate said inlets for providing said gas to a utilization point;

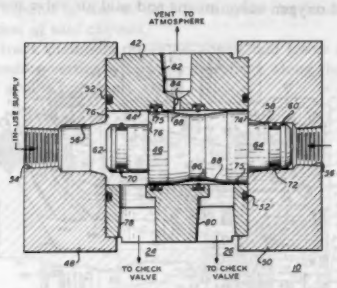
a shuttle body moveable in said bore by the differential pressure of said alternate supplies between a first position whereat said first inlet is placed in communication with said first outlet, and a second position whereat said second inlet is placed in communication with said second outlet;

first sealing means acting at said first inlet when said shuttle body is in said second position for sealing said first inlet from said bore;

second sealing means acting at said second inlet when said shuttle body is in said first position for sealing said second inlet from said bore;

a venting outlet being formed through said housing between said first and second outlets;

third sealing means acting at said bore intermediate said venting outlet and said first inlet and outlet when said body is in said first position for sealing said first inlet and outlet from said venting outlet and said second outlet;



fourth sealing means acting at said bore intermediate said venting outlet and said second inlet and outlet when said body is in said second position for sealing said second inlet and second outlet from said venting outlet and said first outlet; and

said shuttle body being tapered inwardly toward the center thereof to interconnect the venting space defined in said bore between said second and third sealing means with said venting outlet when said shuttle body is in said first position, and to interconnect the venting space defined in said bore between said first and fourth sealing means with said venting outlet when said shuttle body is in said second position.

4,018,245

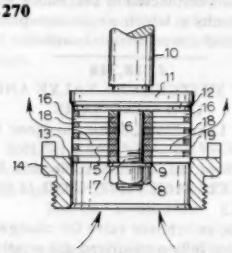
PERFORATED VALVE TRIM AND METHOD FOR PRODUCING THE SAME

Hans D. Baumann, P.O. Box 471, Rye, N.H. 03870

Filed Nov. 12, 1975, Ser. No. 631,203

Int. Cl.² F16K *47/02*

U.S. Cl. 137—270 **4 Claims**



1. Perforated valve trim for the control of fluid flow as part of and between a cylindrical valve plug slidingly engaged in a cylindrical valve orifice comprising:

a vertical stack of horizontal plates, each plate being subdivided into first and second wedge shaped segments, at least one first segment per plate having one or more slotted openings extending in radial fashion throughout a portion of the radial width of said plates, thereby providing access of fluid in the radial direction, at least one second segment per plate having at least one large, vertical flow passage opening therethrough, providing a communicating passage for fluid in the vertical direction; said large vertical opening having a cross-sectional area exceeding the combined cross-sectional areas of the slotted openings of said at least one first segment, all stack plates being angularly displaced with respect to each other about the vertical stack axis, so that in successive stack plates the large opening overlaps the segments encompassing the slotted openings;

whereby are provided a number of separate fluid passages extending through said stack in vertical direction providing access for and communicating with restrictive fluid passages formed by the width of each of said slotted openings and the height of each plate in the horizontal direction.

4,018,246

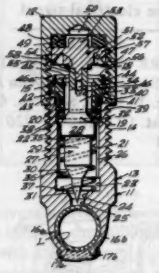
LINE TAP VALVE

Hall Langstroth, Coral Cables, Fla., assignor to Watsco, Inc., Liechtenstein

Filed June 2, 1975, Ser. No. 582,853

Int. Cl.² F16K *43/00*

U.S. Cl. 137—318 **9 Claims**



1. A line tap valve comprising, in combination, an integrally-formed, elongated, valve body member, one end portion of said body member being externally threaded, an internally threaded valve cap member having an inner bottom wall portion and being threadingly receivable on said externally-threaded portion of said body member, said body member, at its threaded end, terminating in a relatively short, reduced-diameter, annular ring portion, the other end portion of said body member extending integrally into a laterally opposed pair of leg portions defining therebetween a semi-circular recess for the transverse seating reception therein of a peripheral outer wall portion of a line to be tapped, said leg portions comprising outwardly-extending leg end portions bendable inwardly about undersurface portions of a seated line to be tapped, said body member being formed with an axial through opening concentric with said reduced-diameter annular ring portion and opening into said recess, a needle mechanism receivable in said through opening for piercing a line to be tapped and thereafter releasably sealing the line, said needle mechanism comprising an elongated needle member having a piercing needle portion at one end operative to enter said recess for piercing a line seated therein for tapping, and means operative upon screwing said valve cap in place on said body member for simultaneously effecting said piercing and sealing and for thereafter retaining said needle mechanism in place within said body member in yieldingly withdrawn position with respect to the pierced line upon subsequent removal of said cap member, said piercing and sealing means comprising a flare pin member removably receivable within said valve cap member, said flare pin member being constrained in abutting relation between said inner bottom wall portion of said valve cap member and the other end of said elongated needle member upon the screwing of said valve cap in place upon said body member, said flare pin member comprising an annular recess defining an annular, tapered outer wall operative, upon the screwing of said valve cap in place upon said body member, to inwardly swadge said annular ring portion into abutting

relation against an outer end portion of said needle mechanism for retaining said needle mechanism in place within said body member.

4,018,247

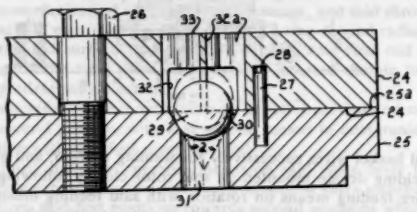
SPRINGLESS BALL VALVE FOR HIGH SPEED COMPRESSORS

Clifford H. Carr, 614 W. 67th St., Kansas City, Mo. 64113

Continuation-in-part of Ser. No. 553,970, Feb. 28, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,566

Int. Cl.² F16K *15/04*

U.S. Cl. 137—512.1 **3 Claims**



1. A unidirectional flow control valve for high speed gas compressors, said valve including

a plurality of loose balls arranged in gas passages through the valve and operable to seat and unseat in response to pressure reversal relative to the balls,

each said ball operably supported to be lifted from and return to a seated sealing position in a seat, each said ball further being free from any mechanical constraints against upward movement, other than its own weight, when in the seated position,

each said seat comprising a frusto-conical surface with respect to which the ball is centered, the included angle of said frusto-conical surface falling within a range of from about 55° to about 65°, the ratio of the diameter of the ball to the smallest end of the frusto-conical surface being about 1.11 to 1,

each said passage further including a chamber above the seat having a diameter greater than the ball, and guide means within the chamber for confining movement of the ball to a substantially vertical path of movement.

4,018,248

VALVE

Charles E. Carr, P.O. Box 419, Lawrenceville, Ill. 62439

Continuation-in-part of Ser. No. 504,167, Sept. 9, 1974, abandoned. This application July 25, 1975, Ser. No. 598,762

Int. Cl.² F16K *21/10;* **F04B** *21/04*

U.S. Cl. 137—514.3 **20 Claims**

1. A valve comprising, in combination,

a valve body,

means defining a quiet chamber within the body,

port means in the valve body beneath the quiet chamber,

an aligning pin extending downwardly into the quiet chamber and secured at its upper portion to the body,

a valve havng a stem, a head, and a seating portion on the head,

cooperating means coactingly mating the aligning pin and valve stem for sliding coaxial movement,

said stem having a thickness smaller than the quiet chamber cross section to define a portion of the quiet chamber surrounding the stem,

a seat in the lower portion of the body proportioned to coact in seating engagement with the valve head,

the valve head, port means, and seat being proportioned for the valve head to mask a portion of the port means in the closed and open positions,

whereby a fluid such as oil entrapped in the quiet chamber will remain entrapped during operation, and the flushing of contaminants passes through the ports away from the quiet chamber.

4,018,249

TIMING DEVICE FOR PNEUMATIC CONTROL

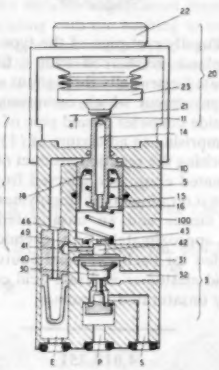
Felix Lameyre, Rueil-Malmaison, France, assignor to La Telemecanique Electrique, France

Filed Nov. 12, 1975, Ser. No. 631,342

Claims priority, application France, Nov. 22, 1974, 74.38398

Int. Cl.² F15B *21/10*

U.S. Cl. 137—624.11 **5 Claims**



1. In a pneumatic control system of the type comprising a control valve and an inlet for a control pressure, a timing device for adjustably delaying the shifting of said control valve after application of said control pressure to said inlet, said timing device comprising:

a shutter movable from a first to a second position; time delay means for displacing the movable shutter from the first to the second position in a predetermined adjustable time delay; a first conduit provided with the said control pressure inlet; pressure responsive means movable in response to pneumatic pressure, said pressure responsive means being operatively connected to said first conduits; a second conduit having an orifice connected to exhaust a throttle connecting the first conduit to the second con-

duit; a tubular member linked to said pressure responsive means and having first and second openings at the respective first and second ends thereof, said tubular member being movable between a first predetermined position in which the first end thereof engages the shutter and the first opening is closed while the second opening is open and a second predetermined position in which the first opening is open while the first end of the tubular member is separated from the shutter by a predetermined distance and the second opening is connected to the said orifice; resilient means cooperating with the tubular member and being adapted to maintain the first end thereof in engagement with the shutter to place the shutter in its first position; the shutter engaging the first end of the tubular member and closing the first opening thereof when both the shutter and the tubular member are in their second position; and means for shifting said control valve, said shifting means being responsive to a variation of pressure within the second conduit.

4,018,250

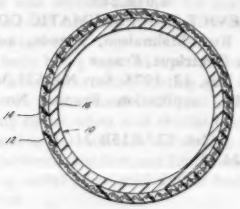
MODIFIED VINYL ESTER RESIN AND PIPE MADE THEREFROM

William D. Waters, Tulsa, Okla., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio

Division of Ser. No. 428,116, Dec. 26, 1973, Pat. No. 3,928,491. This application June 23, 1975, Ser. No. 589,539

Int. Cl.² F16L *9/12, 9/14*

U.S. Cl. 138—140 **5 Claims**



1. In a centrifugally cast pipe of the type having a body of thermosetting plastic reinforced with a fibrous reinforcing material distributed essentially throughout said thermosetting plastic, the improvement which comprises an unreinforced lining on the inside diameter of said pipe of a flexible thermosetting resin comprising an admixture of (1) a neat thermosetting resin comprising the reaction product of an epoxy resin, a carboxyl terminated elastomer selected from the group consisting of carboxyl terminated homopolymers and copolymers of conjugated dienes and an unsaturated monocarboxylic acid, wherein approximately one chemical equivalent of epoxy is provided for each chemical equivalent of carboxyl provided by said elastomer and said acid combined, and (2) an ethylenically unsaturated monomer.

4,018,251

MACHINE FOR MAKING REINFORCING BASKETS FOR STEEL CONCRETE POSTS, MASTS, PIPES AND THE LIKE

Günter Mündel, Kehl, and Friedrich Grampp, Rheinbischofsheim-Diersheim, both of Germany, assignors to Ed. Zublin Aktiengesellschaft, Stuttgart, Germany

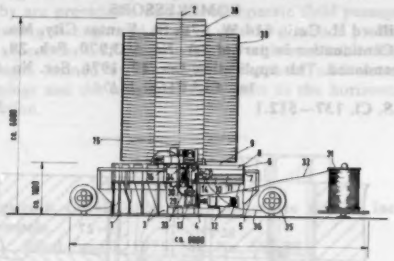
Filed July 9, 1975, Ser. No. 594,572

Claims priority, application Germany, July 9, 1974, 2432855

Int. Cl.² B21F *27/10*

U.S. Cl. 140—112 **16 Claims**

1. A machine for making reinforcing baskets with longitudinal basket wires and helical wires around said basket wires for steel concrete posts, masts, pipes, and the like, which includes in combination: a displacing device operable to displace longitudinal basket wires and comprising wire storage means and individual guiding means therewith for movement of said longitudinal basket wires, a ring member, said guiding means being arranged in said ring member about a vertical winding axis, a wire winding device mounted on a rotor rotatable about said vertical winding axis and having wire feeding means for helically applying winding wire in contact with said longitudinal basket wires successively for welding thereto, and a wire welding device mounted on said rotor closely following said wire feeding means on rotation with said feeding means for securing said winding wire, while in contact with each longitudinal wire, both said wire winding device and said wire welding device being located inside said ring member for said individual guiding means.



4,018,252

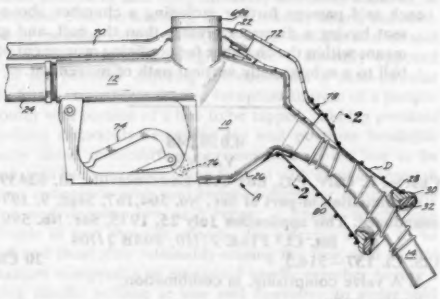
ANTI-POLLUTION NOZZLE ASSEMBLY

Wilson A. Burtis, 5011 Harvard Ave., Westminster, Calif. 92683, and William C. Babcock, 3732 Walker Lee Drive, Los Alamitos, Calif. 90720

Continuation-in-part of Ser. No. 409,939, Oct. 26, 1973, Pat. No. 3,907,010. This application Sept. 22, 1975, Ser. No. 615,581

Int. Cl.² B65B *31/06*

U.S. Cl. 141—45 **1 Claim**



1. A device for use in dispensing a volatile liquid hydrocarbon fuel into the fuel inlet tube of a tank without vapor of said fuel escaping to the ambient atmosphere from a first end of said inlet tube, said device including:

a. a valve body assembly that has first and second concurrently operable spring-loaded valve members within the interior thereof that tend to remain in first positions, said first valve member when in said first position obstructing communications between first and second passages in said valve body assembly and said second valve member when in said first position obstructing communications between third and fourth passages in said valve body assembly; and said first and second valve members when moved to second positions so controlling the rate at which liquid fuel discharges into said tank from said

second passage relative to the rate at which fuel vapor is withdrawn from said tank through said third and fourth passages that the vapor pressure in said tank is not increased appreciably.

b. first means for supplying said fuel to said first passage from a reservoir for said fuel;

c. a tubular nozzle secured to said valve body assembly and in communication with said second passage, said nozzle of such transverse cross-section as to be slidably inserted in said fuel inlet tube;

d. a resilient longitudinally deformable tubular shroud having first and second end portions, said first end portion of said shroud sealingly supported from said valve body assembly, said shroud cooperating with said nozzle to define an annulus-shaped space therebetween that is in communication with said fourth passage, and said shroud at said second end portion defining a ring-shaped radially tapered surface that sealingly engages said first end of said inlet tube when said nozzle is inserted therein to a predetermined extent;

e. second means for maintaining a negative pressure on said second passage, with said second means in communication with said fuel reservoir; and

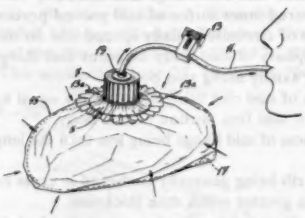
g. third manually operable means on said valve body for concurrently moving said first and second valve members from said first positions towards second positions whereupon liquid fuel flows through said first and second passages and said nozzle to said tank at a desired rate and fuel vapor displaced by liquid fuel entering said tank being drawn into said annulus-shaped space and through said third and fourth passages by said third means to be returned to said reservoir at substantially said desired rate.

4,018,253

HOME VACUUM APPARATUS FOR FREEZER BAGS

Seth Ian Kaufman, 5725 Leger, Cote St. Luc, Quebec, Canada

Filed Oct. 9, 1975, Ser. No. 621,067
Int. Cl.² B65B *31/04*
U.S. Cl. 141—65 **7 Claims**



1. A system for evacuating a flexible container having an open end, comprising;

a hollow retainer member adapted to receive said open end of said container;

a cap member adapted to fit over the outside surface of said retainer member in airtight engagement therewith;

a flexible tube adapted to extend downwardly through the bottom of said cap member into said container and upwardly above said cap member; and

means on the upward part of said tube for opening and closing the passage in said tube;

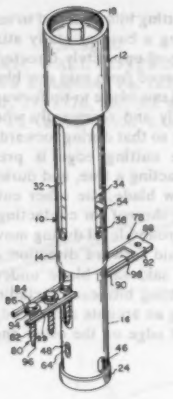
whereby, the open end of said flexible container is adapted to be inserted through said hollow retainer member and to be draped over the top end thereof; and said cap member is adapted to be mounted over the top surface of said retainer member and said open end of said flexible container in airtight engagement therewith so that the passage of said tube is in airtight communication with the interior of said flexible container.

4,018,254

INSTALLATION TOOL APPARATUS

Charles J. DeCaro, Marshfield, Mass., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 17, 1975, Ser. No. 632,676
Int. Cl.² B25B *23/10*
U.S. Cl. 144—32 R **12 Claims**



1. An assembly for attachment to a driving tool having a driver for setting fasteners carried by a strip comprising:

A. a sleeve adapted for attachment to the driving tool;

B. a barrel retractably mounted to the sleeve for retraction therein and having a bore and aligned entry and exit trackways through a wall thereof and into the bore to accommodate the strip;

C. a movable bushing having a strip engaging end and positioned within the sleeve with said end extending into the barrel bore for slidable engagement therewith; and

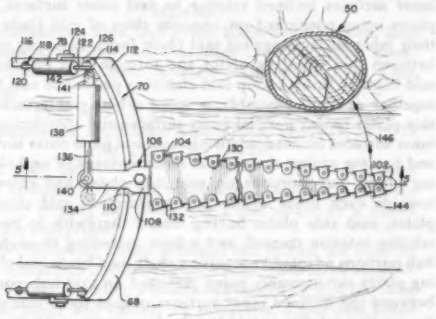
D. means associating with the bushing to urge said bushing between a first position wherein said bushing end is out of engagement with the strip and a second position wherein the bushing end clamps the strip against the trackways to permit the driver to extract the fastener in a setting stroke.

4,018,255

TREE SAW

Richard E. Diggs, S. 12A Road, P.O. Box 776, Carthage, Mo. 64836

Filed Oct. 7, 1975, Ser. No. 620,261
Int. Cl.² A01G *23/08*
U.S. Cl. 144—34 R **15 Claims**



1. An apparatus for sawing trees beneath ground level, comprising:

a mounting means having one end located beneath ground level;

a saw blade having a forward and a rear end and attached to said one end and thus located beneath ground level;

motive power means attached to said mounting means for urging said saw blade against a side of a tree and for alternately moving said saw blade in a forward and then in a rearward direction so that said saw blade undergoes a sawing motion;

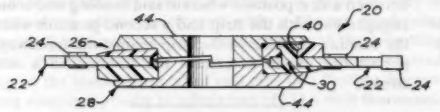
a multiplicity of cutting bits attached to said saw blade, each cutting bit having a base pivotally attached to said saw blade and a pair of oppositely directed cutting edges on said base and spaced from said saw blade, said bits being mounted on said saw blade to tip forwardly when said saw moves rearwardly and rearwardly when said saw blade moves forwardly so that during forward movement of said saw blade, one cutting edge is presented outwardly thereof for contacting a tree, and during rearward movement of said saw blade, the other cutting edge is presented outwardly thereof for contacting a tree for cutting a tree beneath ground level during movement of said saw blade in both said forward direction and said rearward direction when said saw blade undergoes said sawing motion, said cutting bits each including a pair of faces, each face having an arcuate cutting edge on one end and an arcuate relief edge on the other end thereof.

4,018,256

ADJUSTABLE DADO HEAD

Edward J. Niehaus, Tupelo, Miss., and James R. Hosack, Guelph, Canada, assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Feb. 5, 1976, Ser. No. 655,630
Int. Cl.² B27B 33/00
U.S. Cl. 144—238 **4 Claims**



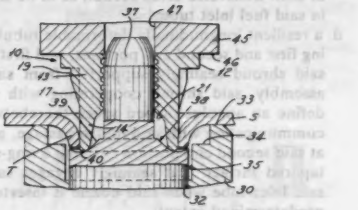
1. A tool rotatable about an axis for milling a groove in a workpiece, comprising a cutter head assembly including a blade having flat opposite faces, a large aperture centrally thereof, and a multiplicity of openings for through fasteners, a pair of clamping plates formed with an aperture centrally thereof and having parallel outer surfaces and complementary inner surfaces inclined relative to said outer surfaces, said plates being positioned on opposite sides of said blade with their inner surfaces against said blade faces, fastening means between said clamping plates and through said openings in said blade to firmly clamp said clamping plates and said blade together as a sub-assembly; a spool sub-assembly including side plates having parallel outer surfaces and complementary inner surfaces inclined relative to said end plate outer surfaces and bearing against the parallel outer surfaces of said clamping plates, hub portions on said side plates and extending towards each other within the apertures of said clamping plates, said side plates having means therewith to prevent relative rotation thereof, and a bore extending through said hub portions adapted to receive a shaft, said blade and clamping plates sub-assembly being mounted on said hub portions between the inclined inner surfaces of said spool side plates for rotation relative to said spool sub-assembly, said clamping plates being firmly fastened to either side of said blade by means permitting assembly in one orientation only.

4,018,257

SELF-FLANGING NUT AND JOINT CONSTRUCTION

James A. Jack, Windsor, Canada, assignor to Cold Fasteners, Inc., Windsor, Canada

Filed Dec. 15, 1975, Ser. No. 640,897
Int. Cl.² F16B 39/28
U.S. Cl. 151—41.72 **2 Claims**



1. In a self-flanging nut construction, the combination comprising

a tubular body having a laterally extending annular flange at one end and an opening therethrough,

said flange having a substantially flat outer surface coextensive with said end of said body,

said opening having a first portion and a second portion of differing cross sectional area,

the outer surface of said tubular body being cylindrical,

said first portion of said opening in said body adjacent said flange being formed with a thread substantially throughout its axial extent,

said second portion defining a riveting flange having a free end remote from said first portion,

the inner surface of said second portion being uniformly tapered inwardly in the direction of said first portion substantially throughout its axial extent,

the outer edge of said free end of said riveting flange being curved at a given radius smoothly blending into said cylindrical outer surface,

the inner edge of said free end being curved at a lesser radius than said outer edge and smoothly blending into said tapered inner surfce of said second portion,

a plurality of circumferentially spaced ribs on the cylindrical periphery of said body adjacent said flange and extending axially along said body,

the length of said ribs being substantially equal to the axial length of said first portion of said body,

the thickness of said flange being less than the length of said ribs,

each said rib being generally U-shaped in cross section and having a greater width than thickness,

the circumferential spacing between said ribs being several times greater than the width thereof such that a portion of the cylindrical periphery of said body is interposed between adjacent ribs,

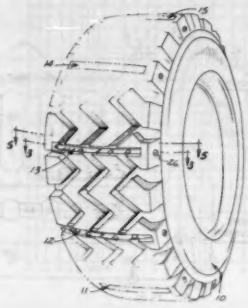
each said rib extending from said flange toward said second portion to form a free end,

said free end of each said rib being tapered,

the radial thickness of said second portion of said body being substantially constant throughout and having an internal surface which is slightly tapered inwardly,

the radial thickness of said second portion being such that when the nut is placed adjacent a sheet metal plate having an opening therein with the opening in alignment with the opening in the nut and the nut is forced against said sheet metal plate, the metal surrounding said opening in said plate is deformed axially of the opening by said second portion to form a tubular portion, and thereafter when an axial force is applied to said free end of the riveting flange, the riveting flange is deformed laterally outwardly over the tubular portion formed on said plate.

4,018,258
ANTI-SKID DEVICE FOR VEHICLE WHEEL
Vay F. Neal, 225 S. Main St., Punxsutawney, Pa. 15767
Filed July 29, 1975, Ser. No. 600,050
Int. Cl.² B60C *27/20*
U.S. Cl. 152—208 **8 Claims**



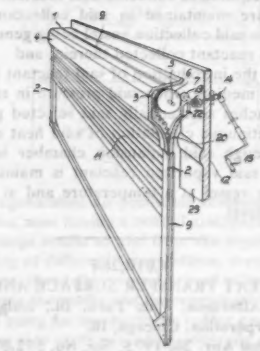
5. An anti-skid device for vehicle wheels equipped with tires, said anti-skid device comprising:

a plurality of individual anti-skid units mounted on each tire,

each of said units including a resilient member mounted in a recessed portion of the tire, said resilient member having an anti-skid surface, and

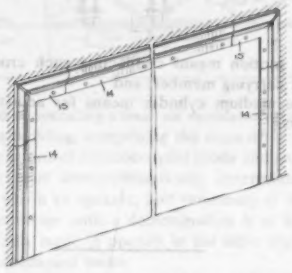
an adjusting mechanism mounted on the tire and coupled to the resilient member for loading the resilient member axially to vary the anti-skid surface from a retracted position within the recessed portion of the tire to a position with the anti-skid surface extending beyond the outer surface of the tire.

4,018,259
JALOUSIE ELEMENT
Günter Herms, Siegburg-Kaldauen, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany
Division of Ser. No. 110,698, Jan. 28, 1971, Pat. No. 3,840,061. This application June 27, 1974, Ser. No. 483,838
Int. Cl.² E06B *9/10*
U.S. Cl. 160—26 **3 Claims**



1. In combination on a rolling closure for a wall opening: a box having end walls, a shaft extending along said box and rotatingly supported by said end walls, a flexible shield having one end connected to said shaft and adapted to be rolled up on the shaft by rotation of the shaft, and a guiding frame guidingly engaging the lateral edges of said shield, said guiding frame being connected to said box and forming an assembly therewith adapted to be mounted as a unit in operative relation to the wall opening, actuating means for driving said shaft, an adjustably mounted transmission outside one of said end walls connecting said actuating means to said shaft and having a housing, and support rails on said one end wall supportingly engaging said housing and providing guiding means therefor, said guiding means being in the form of opposed U shaped support rails.

4,018,260
FABRIC WALL COVERINGS
Floyd M. Baslow, New Bethlehem, Pa. 16242
Filed Apr. 27, 1976, Ser. No. 680,703
Int. Cl.² A47H *23/00, 13/00*
U.S. Cl. 160—327 **4 Claims**



1. An assembly of border pieces for creating a framework attachable to a wall or other flat surface for mounting a fabric sheet which is cut to dimensions at least sufficient to cover the surface, said assembly comprising linear border pieces and right angle corner border pieces which are arranged in end-to-end relation to define a framework that follows the perimeter of the area to be covered, each piece including a raised face, a storage channel running adjacent the outer edge of the piece and having a narrow inlet communicating with said face, the portion of the selvage of said sheet which includes fabric material in excess of that necessary to cover said surface being stuffed in said storage channel so that the exposed selvage of the sheet lies against said face to present a smooth appearance which extends to said inlet and is directly adjacent said perimeter, said linear pieces being formed of an integral one piece plastic material of sufficient elasticity to permit dilation of said inlet whereby said inlet may be temporarily expanded to admit said excess material and then contracted to retain said excess material in said storage channel.

4,018,261
CONTINUOUS CASTING PLANT STRAND GUIDING MEANS
Alois Scheinecker, Linz, and Franz Kagerhuber, Traun, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria
Filed May 12, 1976, Ser. No. 685,545
Claims priority, application Austria, May 13, 1975, 3625/75
Int. Cl.² B22D *11/128*
U.S. Cl. 164—282 **11 Claims**

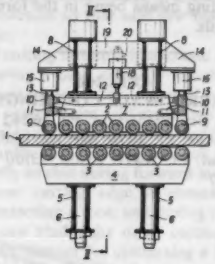
1. A continuous casting plant strand guiding means for supporting, guiding and extracting a cast strand or a starter bar, which comprises:

sets of supporting rollers arranged one behind the other in the extraction direction of the strand, each set of supporting rollers including a number of rollers located opposite each other and carried by respective upper and lower roller carrying members also arranged opposite each other, which members are adjustable perpendicular to the strand surface and fixable, the strand or the starter bar

being guided between the respective supporting rollers of the upper and lower carrying members;

a plurality of driving rollers, at least one driving roller being arranged at at least one end of a set of supporting rollers;

cross beams movable perpendicularly to the strand surface, each cross beam carrying at least one driving roller;



parallel motion means connecting each cross beam to a roller carrying member; and

pressure medium cylinder means for adjusting the cross beams.

4,018,262

HEAT EXCHANGE WITH GAS/SOLIDS MIXTURES

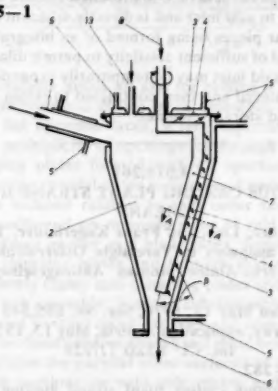
Klemens Jaschinski; Werner Fuhr, both of Krefeld-Uerdingen, and Karl Brandle, Odenthal-Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 24, 1975, Ser. No. 552,495

Claims priority, application Germany, Mar. 6, 1974, 2410724

Int. Cl.² F28F *17/00*

U.S. Cl. 165—1 **5 Claims**



1. A process for indirect heat-exchange between a solids-containing gas and the inner wall of a heat-exchanger through which the solids-containing gas to be cooled or heated flows, comprising continuously introducing a flushing medium separately from the solids-containing gas into the heat exchanger while the gas is flowing therethrough, the flushing medium being impinged obliquely onto the wall and periodically sweeping about said wall whereby said wall is kept substantially free from solid deposits.

4,018,263

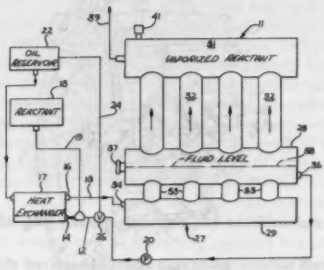
METHOD AND APPARATUS FOR GENERATING AND STORING GASEOUS FLUIDS

Bernard Ulano, 1952 Coldwater Canyon, Beverly Hills, Calif. 90210

Filed Apr. 17, 1975, Ser. No. 568,926

Int. Cl.² F22B *1/02*

U.S. Cl. 165—1 **10 Claims**



1. A process for the generation and storage of a vaporized reactant composition for subsequent utilization of said vaporized reactant in a vapor phase reaction, said process comprising:

heating a fluid heat exchange medium to an operating temperature above the vaporization temperature of said reactant;

introducing said reactant in non-vaporized form into said heat exchange medium and maintaining said heat exchange medium and reactant under confined conditions so that said reactant is at least partially vaporized in said medium and said vapors are entrained therein said heat exchange medium being substantially non-volatile at said operating temperature and inert with respect to said reactant;

expanding said heat exchange medium containing vaporized reactant in an expansion chamber and permitting at least a portion of said reactant vapors to escape from said heat exchange medium in said expansion chamber;

leading said reactant vapors to a collection vessel, said collection vessel interior being maintained at a temperature above the vaporization temperature of said reactant;

maintaining said reactant vapors in said collection vessel at a selected pressure, said pressure level being less than the pressure required to condense said reactant vapors at the temperature maintained in said collection vessel said pressure in said collection vessel being generated by said vaporized reactant collected therein; and

terminating the introduction of said reactant into said heat exchange medium when said pressure in said collection vessel reaches substantially said selected pressure level while continuous circulation of said heat exchange medium through said expansion chamber is maintained, whereby said vaporized reactant is maintained in said collection vessel at a temperature and at said selected pressure level.

4,018,264

BOILING HEAT TRANSFER SURFACE AND METHOD

Clarence E. Albertson, Villa Park, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

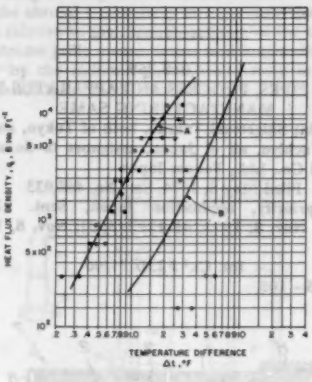
Filed Apr. 28, 1975, Ser. No. 572,376

Int. Cl.² F28F *13/18*

U.S. Cl. 165—1 **2 Claims**

1. A process for transferring heat from a warm fluid to a boiling liquid comprising the steps of: providing heat exchange apparatus having a thermally conductive wall, said wall having a nodularized metallic coating plated on one side thereof, said coating being characterized by a surface having macroscopic

promontories extending generally normal to the surface of said wall, said promontories being irregularly arrayed, the terminal portions of said promontories being deformed laterally in a plane parallel to said coating; completely covering



said coating with said liquid; and contacting the other side of said wall with said warm fluid whereby said coating enhances the formation and discharge of vapor as bubbles emerging over the surface covered by said coating.

4,018,265

REGENERATIVE AIR PREHEATER

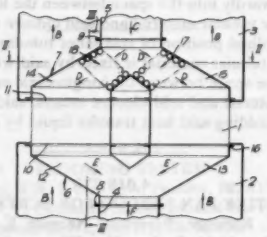
Siegfried Hans-Dietmar Schlüter, Wenden, Germany, assignor to Apparatebau Rothemuhle Brandt & Kritzler, Wenden, Germany

Filed July 7, 1975, Ser. No. 593,317

Claims priority, application Germany, July 16, 1974, 2434101

Int. Cl.² F28D *17/00*

U.S. Cl. 165—7 **12 Claims**



1. Rotary regenerative air preheater comprising a cylindrical regenerative mass having a central axis, ducts for conducting heat-exchange media to and from the regenerative mass, the media being of different temperatures, means for causing relative rotation about the central axis of at least one of the ducts conducting the media and the regenerative mass, one of the said ducts being for conducting a colder one of the media and comprising side walls extending generally radially of the central axis, and preliminary heating means for the colder medium comprising recuperative heating surfaces in the said one of the said ducts extending generally tangentially of the central axis and defining a plurality of conduction passages for the hotter of the media across the duct, the passages opening in each of the said side walls whereby to contact the hotter of the media with the said surfaces.

4,018,266

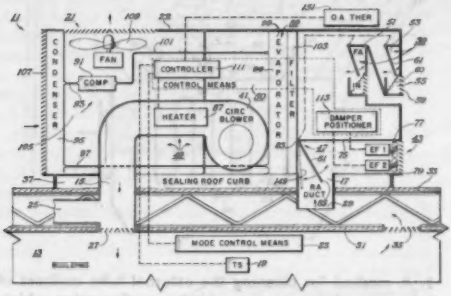
BUILDING FRESH AIR VENTILATOR SYSTEM

Herbert M. Kay, Waco, Tex., assignor to Command-Aire Corporation, Waco, Tex.

Filed Apr. 30, 1975, Ser. No. 573,347

Int. Cl.² F25B *29/00*

U.S. Cl. 165—12 **8 Claims**



8. A method of operating a fresh air ventilator system for air conditioning a building, comprising the steps of:

a. operating in one of an unoccupied mode and an occupied mode; at least semi-automatically determining which mode in which to operate; and remaining in that mode during operation until a determination is at least semi-automatically made to operate in the other mode;

b. in said unoccupied mode:

i. circulating return air as needed in said building;

ii. conditioning the air being circulated as needed;

iii. at least semi-automatically determining that the occupied mode is to be entered into;

c. in the occupied mode:

i. circulating a mixture of return and fresh air;

ii. automatically determining the type of conditioning to be employed and employing one of a heating operation and a cooling operation;

I. in said heating operation, when determined to be necessary, adding heat as needed until a determination is made that the unoccupied mode is to be employed;

II. in said cooling operation, when determined to be necessary:

A. circulating outside air as needed to obtain the preset temperature; up to the maximum in which all of the air being circulated is fresh air;

B. at a first predetermined proportion of the air being circulated being fresh air, energize a first exhaust fan;

C. at a second predetermined proportion of the air being circulated being fresh air, energize a second exhaust fan serially and in addition to said first exhaust fan;

D. operating with an indicated proportion of outside air to maintain the desired temperature as long as the outside air is below a first predetermined temperature;

E. upon the occurrence of a temperature in the building higher than the preset temperature and the temperature of the outside air rising above said first predetermined temperature, entering upon a heat removal operation as follows:

1. circulating the minimum allowable proportion of fresh air while exhausting the minimum proportion of return air; and

2. energizing the auxiliary cooling to remove heat from the air being circulated to maintain said preset temperature;

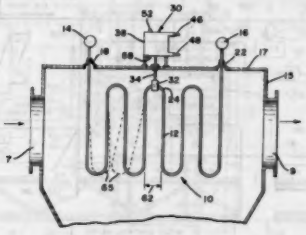
F. upon the occurence of outside air dropping below the first predetermined temperature, returning to outside air cooling in accordance with steps A–D; and

G. at least semi-automatically determining that the unoccupied mode is to be entered into, terminating the cooling operation and entering into the unoccupied mode.

4,018,267
CLEANING HEAT EXCHANGER TUBES

Giorgio Tomasicchio, Milan, Italy, assignor to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Jan. 10, 1975, Ser. No. 540,124
Int. Cl.² F28D 11/06; F28G 11/07
U.S. Cl. 165—84 6 Claims

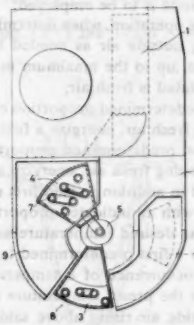


1. A method for cleaning the external tube surfaces of a tubular array having a looped tube configuration which is exposed to hot dusty gases in a heat exchanger, comprising the step of applying a force in pulses to said tubular array at a frequency corresponding to the resonant frequency of said tubular array, or a low fractional multiple thereof, thereby inducing vibration of said tubular array at the resonant frequency thereof with relatively moderate applied force said applied force being sufficient to induce vibration of a magnitude such that the extremities of adjacent loops of said tubular array are brought into sharp rapping contact to shake the dust and scale from said external tube surface.

4,018,268
INDUCTION AIR-CONDITIONING APPARATUS

Henrik Kallies, Pflugacker 25a, 2 Hamburg 57, Germany

Continuation of Ser. No. 499,141, Aug. 21, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 678,399
Int. Cl.² F24F 3/08; F28D 11/04; F28F 5/00, 13/06
U.S. Cl. 165—86 1 Claim



1. Air-conditioning apparatus comprising, in combination, a housing having an inlet and an outlet and fixed air guiding panels defining a stationary airflow path through said housing, an air heating heat exchanger within said housing, an air cooling heat exchanger within said housing, a rotatable heat exchanger support supporting said heat exchanges within said housing for rotation about an axis whereby said heating and cooling heat exchangers are selectively positionable within said airflow path to selectively heat or cool the air flowing through said housing, said rotatable support being mounted within said housing adjacent said inlet whereby said heat exchangers are selectively rotatable into said inlet and said airflow path, said heat exchangers being mounted on said support in spaced circumferential relation with respect to the axis of support rotation defining a neutral zone for selective positioning within said airflow path whereby upon positioning said neutral zone within said inlet air may enter said housing through said inlet through said neutral zone bypassing said heat exchangers.

4,018,269
HEAT PIPES, PROCESS AND APPARATUS FOR MANUFACTURING SAME

Ichiro Honda; Shigetoshi Takasu, both of Tokyo, and Yoshio Onuki, Yachiyo, all of Japan, assignors to Suzuki Metal Industrial Co., Ltd., Tokyo, Japan

Filed May 8, 1974, Ser. No. 468,033
Claims priority, application Japan, Sept. 12, 1973, 48-103494; Nov. 8, 1973, 48-129393[U]; Nov. 8, 1973, 48-129394[U]
Int. Cl.² F23D 15/00
U.S. Cl. 165—105 5 Claims

1. A heat pipe utilizing a heat transfer liquid, comprising an elongated outer metal tubular material, closure means closing each longitudinal end of said outer tubular material, an elongated inner metal tubular material disposed coaxially within said outer tubular material, said inner tubular material having a diameter less than the diameter of said outer tubular material to thereby define an annular space therebetween, said inner tubular material having a longitudinal length less than the longitudinal length of said outer tubular material such that the longitudinal ends of said inner tubular material are spaced from said closure means, a wick of metal fibers disposed longitudinally in said annular space in a substantially uniform layer, said wick being in tow form and having a longitudinal length greater than the longitudinal length of said inner tubular material, said wick having its longitudinal ends turned radially inwardly into the space between the longitudinal ends of the inner tubular material and said closure means, whereby the longitudinal position of said inner tubular material within said outer tubular material is fixed by said wick which is disposed in the space between the longitudinal ends of said inner tubular material and said closure means, said metal fibers of said wick holding said heat transfer liquid by capillary action.

4,018,270
AUTOMOTIVE FAN SHROUD FOR SCREENING DEBRIS

Kenneth J. Kolinger, Riverside; Norman E. Williams, Park Ridge; Donald M. Earley, Glen Ellyn, and William R. Golden, Bloomingdale, all of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Nov. 6, 1975, Ser. No. 629,442
Int. Cl.² F28F 19/00
U.S. Cl. 165—119 5 Claims

1. Power unit guard and cooling structure provided for, and having mounting means to, a vehicle supporting a heat-generating power unit thereon, comprising:

a heat exchanger operatively associated with said power unit for dissipating heat therefrom; and

a cooling fan having a driving connection with said power unit;

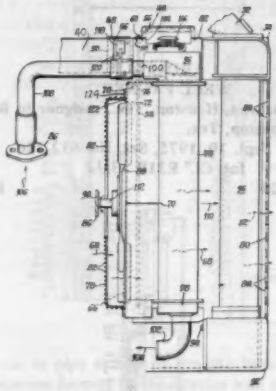
said structure including a fan shroud and radiator guard secured together, said fan shroud presenting a generally circular, through-opening adapted to surround the fan

and, together with said guard defining a longitudinal cooling air path;

upstream grille means across said longitudinal path carried transversely by the shroud in an anterior position thereto;

intervening debris grille means across said air path carried by the shroud transversely in a generally posterior location relative to the through-opening of the shroud;

downstream grille means across said longitudinal path carried by the radiator guard transversely in a generally posterior location thereto; and



means for mounting the heat exchanger and cooling fan in the guard and cooling structure, with the fan intermediate the upstream and intervening grille means and the heat exchanger intermediate the intervening and downstream grille means, enabling air impelled under pressure to be blown from and by the fan, thence through the intervening debris grille means, heat exchanger, and downstream grille means in that order.

4,018,271

FLOORING SYSTEM

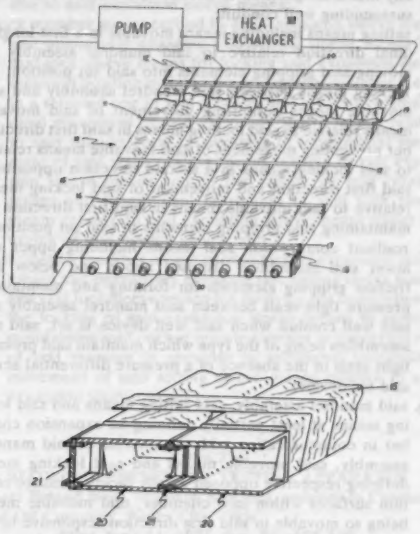
Robert S. Jones, R.R. 3 Box 79A, Pontiac, Ill. 61764; Wesley E. Jones, R.R. 1, Chestnut, Ill. 62518, and Harry W. Smathers, 17 Knollwood Drive, Aurora, Ill. 60538

Filed Feb. 24, 1975, Ser. No. 552,285

Int. Cl.[2] F28F *9/02*

U.S. Cl. 165—175 **7 Claims**

1. A flooring system comprising elongated tubular slats having given shaped end openings adapted to pass fluid therethrough, means for laterally joining said slats in a laterally adjacent and parallel planar series to form a floor panel, a pair of fluid manifolds for respectively enclosing opposite ends of said slats of said floor panel, said manifolds each being a series of segmented fluid couplers having openings respectively complemental to and longitudinally connected with said slat openings to form longitudinal fluid passing extensions of said slats, said manifold coupler segments having given shaped lateral openings adjacent said slat ends, and coupler joints having outwardly opposed surfaces complemental to adjacent ones of said lateral segment openings and secured to said manifold segments between adjacent segment openings to normally engage said lateral segment openings to seal and



separate said adjacent lateral openings and for joining adjacent coupler segments to form said manifolds.

4,018,272

WELL PACKER APPARATUS

Joe R. Brown; William C. Lindsey, and Phillip H. Manderscheid, all of Houston, Tex., assignors to Brown Oil Tools, Inc., Houston, Tex.

Filed Apr. 7, 1975, Ser. No. 565,385

Int. Cl.[2] E21B *33/12*

U.S. Cl. 166—119 **22 Claims**

18. A retrievable well device carried by a tubular well conduit and adapted to be set to anchor to a surrounding well conduit at a subsurface location comprising:

a. a mandrel assembly connected with said tubular well conduit;

b. an anchoring assembly carried on said mandrel assembly;

c. friction gripping elements included in the anchoring assembly, said gripping elements being expandable radially into a set position to anchor said well device to said surrounding well conduit;

d. setting means including means movable in a first longitudinal direction relative to said mandrel assembly for moving said gripping elements into said set position;

e. locking means between said mandrel assembly and said movable means permitting movement of said movable means relative to said locking means in said first direction but preventing movement of said movable means relative to said locking means in a second direction opposite to said first direction and movement of said locking means relative to said movable means in said first direction for maintaining said gripping elements in said set position;

f. resilient compression seal means including upper and lower seal assemblies disposed above and below said friction gripping elements for forming and maintaining pressure tight seals between said mandrel assembly and said well conduit when said well device is set, said seal assemblies being of the type which maintain said pressure tight seals in the absence of a pressure differential across said set device;

g. said mandrel assembly, said setting means and said locking means at least partially defining an expansion chamber in communication with the interior of said mandrel assembly, said movable means and said locking means defining respective opposed axially facing pressure reaction surfaces within said chamber, said movable means being so movable in said first direction responsive to the application of fluid pressure above a first limit from said mandrel assembly to said expansion chamber to move said gripping elements into said set position; and

h. linking means interconnecting said locking means and said mandrel assembly, said linking means including a retrieving link, for preventing movement of said locking means relative to said mandrel assembly in said second direction and movement of said mandrel assembly relative to said locking means in first direction upon application of fluid pressure below a second limit, greater than said first limit, through said mandrel assembly to said chamber, and severable upon application of fluid pressure above said second limit through said mandrel assembly to said chamber to permit release of said well device from set position by longitudinal, non-rotative movement of said tubular well conduit and said mandrel assembly in said first direction.

4,018,273

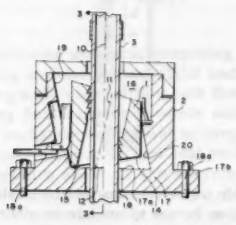
MANDREL LOCKING SLEEVE

Robert Frank Berry, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 579,990, May 22, 1975, Pat. No. 3,976,124, which is a continuation-in-part of Ser. No. 411,983, Nov. 1, 1973, Pat. No. 3,904,233. This application Apr. 2, 1976, Ser. No. 673,164

Int. Cl.² E21B *23/00*

U.S. Cl. 166—120 **3 Claims**



1. A mandrel gripping sleeve comprising:

a generally cylindrical member having a dual axis bore passage therethrough and adapted for slidable and partially rotatable engagement on a mandrel;

said dual axis bore passage having a first axial bore passage with relatively smooth walls, and a second axial bore passage with internally toothed sections; and,

said member having abutment means thereon, arranged when externally abutted, to induce a rotational moment in said member such that said member is induced to rotate said second axial bore passage toward the mandrel passing through said member.

4,018,274

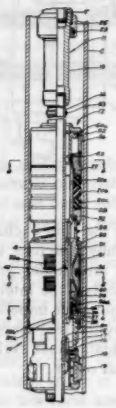
WELL PACKER

Chudleigh B. Cochran, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Sept. 10, 1975, Ser. No. 612,226

Int. Cl.² E21B *33/12*

U.S. Cl. 166—129 **12 Claims**



1. A well packer apparatus adapted to be carried by a tubing string in a well conduit comprising:

a. sealing means extendable between sealing and non-sealing engagement with the well conduit for selectively preventing or permitting fluid flow through said well conduit;

b. anchoring means extendable between anchoring and non-anchoring engagement with said well conduit for selectively anchoring said packer to the conduit or releasing said packer for movement relative to the conduit;

c. primary flow passage means extending through said packer for conducting fluids through said sealing means;

d. secondary flow passage means extending through said packer selectively operable for bypassing fluids through said packer when said sealing means is in sealing engagement with the well conduit;

e. setting means operable by movement of said tubing string in one direction for setting said packer by moving said sealing means into sealing engagement with said well conduit and moving said anchoring means into anchoring engagement with said well conduit;

f. locking means for locking said packer in set condition;

g. blocking means movable between blocking and non-blocking positions for blocking and not blocking, respectively, movement of said locking means toward unlocked position; and

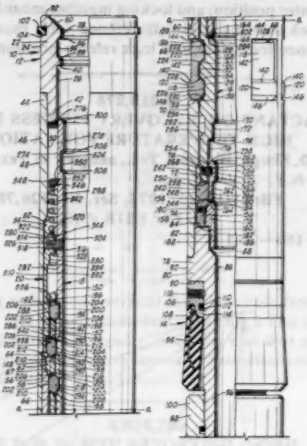
h. means operable by movement of said tubing string in the opposite of said one direction for moving said blocking means to non-blocking position.

4,018,275

ANCHORING DEVICE FOR WELL TOOLS

Robert T. Gaut, 2730 NW. 31st St., Oklahoma City, Okla. 73112

Filed May 12, 1976, Ser. No. 685,496
Int. Cl.² E21B 23/00
U.S. Cl. 166—137 14 Claims



1. For use in pipe strings or the like having one or more annular recesses formed in the interior wall surfaces thereof, an anchoring device anchorable in a selected one of said recesses, comprising:

a tubular body insertable in the interior of a pipe string;

expansion sleeve means disposed within said tubular body for longitudinal movement relative thereto;

setting sleeve means disposed within said tubular body in longitudinal telescopic relation with said expansion sleeve means for longitudinal movement relative to said tubular body and to said expansion sleeve means;

lock sleeve means disposed within said tubular body releasably securable to said setting sleeve means and in longitudinal telescopic relation with said expansion sleeve means for longitudinal movement relative to said tubular body and to said expansion sleeve means;

biasing means operatively engaging said lock sleeve means for urging said lock sleeve means longitudinally toward said expansion sleeve means;

retainer means releasably securing said lock sleeve means to said setting sleeve means against the urging of said biasing means, said retainer means being releasable in response to predetermined longitudinal movement of said setting sleeve means relative to said tubular body;

at least one opening formed in the wall of said tubular body;

anchor member means disposed in said at least one opening for moving radially into and out of a selected one of said recesses;

inwardly projecting shoulder means formed on said anchor member means;

outwardly projecting enlargement means formed on said expansion sleeve means and movable therewith relative to said anchor member means between positions in and out of registration with said shoulder means for displacing said anchor member means radially outwardly into a selected one of said recesses to anchor said device and for releasing said anchor member means to permit radially inward retraction thereof from a selected one of said recesses in response to longitudinal movement of said expansion sleeve means relative to said tubular body;

latch member means carried by said expansion sleeve means and operatively engaging said setting sleeve means and said tubular body for latching said expansion sleeve means in position maintaining said anchoring member means in a selected one of said recesses in response to longitudinal movement of said setting sleeve means relative to said expansion sleeve means;

lock member means carried by said expansion sleeve means and operatively engaging said setting sleeve means and said lock sleeve means for locking said expansion sleeve means in position maintaining said anchor member means in a selected one of said recesses and preventing longitudinal movement of said expansion sleeve means relative to said tubular body in response to longitudinal movement of said setting sleeve means relative to said expansion sleeve means and to the release of said retainer means and longitudinal movement of said lock sleeve means relative to said expansion sleeve means under the urging of said biasing means; and

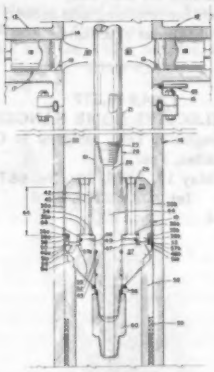
verification member means carried by said expansion sleeve means and operatively engaging said setting sleeve means and said lock sleeve means for verifying the completion of the locking of said expansion sleeve means in position maintaining said anchor member means in a selected one of said recesses in response to additional longitudinal movement of said setting sleeve means relative to said expansion sleeve means.

4,018,276

BLOWOUT PREVENTER TESTING APPARATUS

Robert Euland Bode, Monikie, Scotland, assignor to Continental Oil Company, Ponca City, Okla.

Filed June 14, 1976, Ser. No. 695,340
Claims priority, application United Kingdom, Mar. 19, 1976, 11235/76
Int. Cl.² E21B 23/00, 33/12
U.S. Cl. 166—183 6 Claims



1. A blowout preventer test plug for use in pressure testing a blowout preventer which includes a housing having a housing bore axially formed therethrough and sealably connected to the upper end of a wellhead with said housing bore forming an upward continuation of a wellhead bore through said wellhead and closure means mounted within the housing for extension into said housing bore to seal about a pipe string therein, said plug comprising;

a. a first cylindrical body having an outer diameter slightly smaller than the diameter of said housing bore and said wellhead bore, an axially disposed fluid passageway therethrough and a support means positioned on the upper end of said first body, as positioned for use, for supporting said first body from said pipe string so that it may be raised and lowered within said housing bore and said wellhead bore;

b. a first tubular extension on the lower end of said first body as positioned for use and having an outer diameter less than said outer diameter of said first body and an inner diameter greater than the diameter of said passageway;

c. a circumferential seal means disposed about the outer diameter of said first tubular extension and having an outer diameter substantially equal to or slightly less than said outer diameter of said first body;

d. at least one port communicating through said first body with the axis of said port disposed substantially parallel to the axis of said first body and terminating between the inner diameter of said first tubular extension and the outer diameter of said passageway;

e. a second tubular extension on said lower end of said body, said passageway in said first body extending axially through said second tubular extension;

f. a second cylindrical body slideably positioned on said second tubular extension beneath said first body and having an outer diameter slightly smaller than the diameter of said housing bore and said wellhead bore and a mating circular groove on the upper end of said second cylindrical body, as positioned for use, of a depth and width to mate with said first tubular extension on said first body;

g. means for sealing between the inside of said first tubular extension and said mating groove when said first tubular extension and said mating groove are mated, the portion of said second body between the outer diameter of said circular groove and said outer diameter of said second body being adapted to compress said circumferential seal means when said first tubular extension and said mating groove are mated;

h. means for sealing between said second body and said second tubular extension;

i. at least one port communicating between the bottom portion of said groove and the lower end of said second body as positioned for use; and,

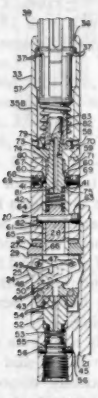
j. retaining means for retaining said second body in position on said second tubular extension.

4,018,277

SELECTIVE BOMB HANGER

Imre I. Gazda, Saginaw, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed May 17, 1976, Ser. No. 687,191
Int. Cl.² E21B *23/00*
U.S. Cl. 166—214 **30 Claims**



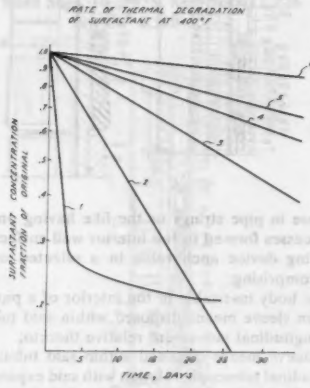
1. A well equipment hanger constructed for being set in a selected nipple down a well including: housing means; lug means pivotally mounted in said housing means for movement between an inner withdrawn state and an outward position; latch structure means latch holding said lug means in said inner withdrawn state and releasable from the latched state for lug means movement to said outward position; lug means outer position lock member means mounted for longitudinal sliding movement within said housing into and out of lug means outer position; interference lock means positionable for locking said lock member means from movement relative to said housing means and in position to back said lug means in said outer position; and locking member means positionable for unlock moving said interference lock means from the interference lock state to a lock release position.

4,018,278

SURFACTANT OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE FORMATIONS

Russell D. Shupe, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,780
Int. Cl.² E21B *43/22*
U.S. Cl. 166—252 **16 Claims**



1. A method for recovering petroleum from a subterranean petroleum containing permeable formation penetrated by at last one injection well and by at least one production well in fluid communication with the formation, said formation temperature being in excess of 120° F, said recovery method being of the type wherein an aqueous fluid is injected into the formation by the injection well and oil is displaced by the injected fluid and recovered from the formation by the production well, wherein the improvement comprises introducing into the formation an aqueous surfactant solution wherein

the sole surfactant present in the sufactant solution is selected from the group consisting of water soluble salts of sulfonated ethoxylated alcohols and sulfonated ethoxylated alkylaryl compounds, and mixtures thereof.

4,018,279

IN SITU COAL COMBUSTION HEAT RECOVERY METHOD

Merrill J. Reynolds, 6111 E. Skelly Drive, Tulsa, Okla. 74135, and Ralph W. Disney, 124 E. 4th St., Tulsa, Okla. 74103

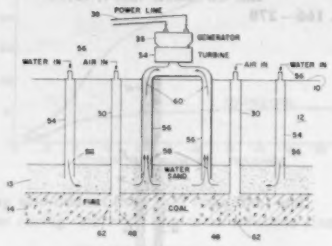
Filed Nov. 12, 1975, Ser. No. 631,108
Int. Cl.² F28D *21/00*; E21B *43/25*
U.S. Cl. 166—258 **4 Claims**

1. In a geologic province where a shallow coal seam is present contiguous to a porous formation, the method of burning the coal in situ and recovering the heat of combustion, comprising:

a. drilling one or more vertical first boreholes from the surface through said porous formation and into said coal seam igniting said coal, and supplying air under pressure through said boreholes to maintain the combustion of said coal;

whereby heat will be transferred from said hot coal seam to said contiguous porous formation;

b. drilling at least one vertical second borehole from the surface to said porous formation and flowing water under pressure into said porous formation; whereby said water will be heated to steam; and



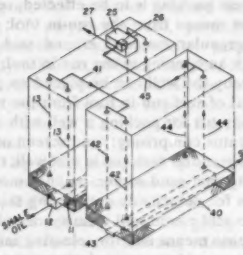
c. drilling at least one vertical third borehole from the surface to said porous formation, inserting a first casing into said third borehole, and connecting said first casing to a steam energy utilization means and simultaneously utilize the heat energy in said steam.

4,018,280

PROCESS FOR IN SITU RETORTING OF OIL SHALE

Nicholas Daviduk, Pennington; David W. Lewis, Lawrenceville, both of N.J., and Michael T. Siuta, Torrance, Calif., assignors to Mobil Oil Corporation, New York City, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,541
Int. Cl.² E21B *43/24*
U.S. Cl. 166—266 **7 Claims**



1. A process of in situ retorting an oil shale deposit to recover hydrocarbons therefrom, said process comprising:

forming a retort zone of rubblized shale within said deposit;

pressurizing a stream of retorting gas by passing it through a compressor means;

heating said pressurized retorting gas stream to a temperature required to retort the oil shale by passing said pressurized gas stream through a heating means;

injecting said heated retorting gas stream into said retort zone to retort said rubblized shale in said retort zone;

recovering gaseous products including said retorting gas from said retort zone;

passing at least a portion of said recovered gaseous products through said compressor means, heating means, and said retort zone until a temperature condition is reached wherein the temperature of the gaseous products being recovered substantially equals a value indicative that there is adequate heat available in said retort zone to complete the retorting process without additional externally supplied heat;

replacing both said compressor means and said heating means with a fan means when said temperature condition is reached;

passing at least a portion of the gaseous products recovered from said retort zone through said fan means; and

continuing circulation of said at least a portion of the gaseous products through said retort zone and said fan means until the recovery of hydrocarbons from said retort zone is completed.

4,018,281

OIL RECOVERY BY WATERFLOODING WITH IMPROVED MOBILITY CONTROL

Harry L. Chang, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 7, 1974, Ser. No. 522,081
Int. Cl.² E21B *43/25*
U.S. Cl. 166—273 **16 Claims**

1. In the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems, the method comprising:

a. introducing into said reservoir via said injection system an initial mobility control slug comprising an aqueous liquid having a predominant continuous aqueous phase the viscosity of which is progressively increased as said initial slug is introduced into said reservoir,

b. subsequent to step (a) introducing into said reservoir via said injection system a terminal mobility control slug comprising an aqueous liquid having a predominant continuous aqueous phase the viscosity of which is progressively decreased as said terminal slug is introduced into said reservoir, and

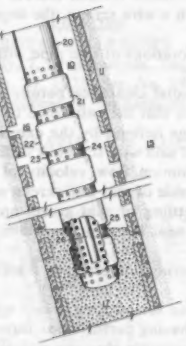
c. recovering oil from said production system.

4,018,282

METHOD AND APPARATUS FOR GRAVEL PACKING WELLS

John W. Graham; William M. Salathiel; Clay Gruesbeck, and Thomas W. Muecke, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Feb. 26, 1976, Ser. No. 661,661
Int. Cl.² E21B *43/04, 43/08*
U.S. Cl. 166—278 **29 Claims**



1. In a method of gravel packing a perforated liner opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said liner to deposit said gravel around said liner, the improvement comprising:

restricting the flow of said carrier liquid into said liner so as to maintain the minimum flow velocity of said carrier liquid along the outside of said liner that is necessary to prevent the premature settling of said gravel and the formation of gravel dunes near the upper portions of said liner.

19. Apparatus for gravel packing wells comprising:

a perforated liner; and

a removable sealant placed on or in said liner to partially

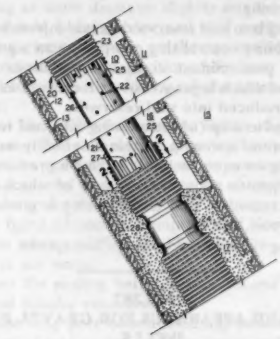
seal said liner, said liner having unsealed perforations substantially throughout its entire length, said sealant being located to selectively seal perforations distributed along said liner to reduce the total flow area of said perforations by at least about 60 percent and to restrict the flow of fluids into said liner.

4,018,283

METHOD AND APPARATUS FOR GRAVEL PACKING WELLS

Larry A. Watkins, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Mar. 25, 1976, Ser. No. 670,303
Int. Cl.² E21B *43/04, 43/08*
U.S. Cl. 166—278 18 Claims



1. In a method of gravel packing a well screen opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said well screen and upwardly through the bottom of said well screen, said well screen including a tubular pipe having perforations formed therein which is concentrically wrapped with a wire screen, the improvement comprising:

sealing the perforations of said pipe with a temporary plugging material;

adjusting the radial clearance between said pipe and said wire screen so that the resistance to flow in the annular shaped passage defined by the exterior of said pipe and the interior of said wire screen is sufficient to maintain at least the minimum flow velocity of said carrier liquid along the outside of said well screen necessary to prevent premature settling of said gravel and the formation of gravel dunes near the upper portions of said well screen; and

selectively removing said plugging material after said gravel is in place.

11. A well screen for packing gravel wells comprising:

a tubular pipe having perforations formed therein;

a selectively removable plugging material sealing the perforations of said pipe;

a wire screen extending circumferentially around said pipe; and

a plurality of standoff wire ribs longitudinally spaced along said pipe, said wire ribs providing a clearance of between about 0.15 inches and 0.25 inches between said pipe mandrel and said wire screen such that the resistance to flow in the annular passages defined by the exterior of said pipe, the interior of said wire screen and the wire ribs is sufficient to maintain at least the minimum velocity of a carrier liquid, having gravel suspended therein, necessary to prevent premature settling of said gravel and the formation of gravel dunes near the upper portions of said well screen during gravel packing.

4,018,284

APPARATUS AND METHOD FOR GRAVEL PACKING A WELL

Lee E. Perkins, Houma, La., assignor to Kajan Specialty Company, Inc., Houma, La.

Continuation of Ser. No. 534,131, Dec. 18, 1974, abandoned.
This application Oct. 20, 1975, Ser. No. 623,993
Int. Cl.² E21B *43/04, 43/10*
U.S. Cl. 166—278 40 Claims

17. A method for packing a well with a granular material, the method comprising the steps of: detachably connecting a sand screen or liner means with a run-in tool; introducing the run-in tool, with its associated sand screen or liner means, into said well; positioning the sand screen or liner means in the well location wherein packing is to be effected; releasing the sand screen or liner means from the run-in tool; introducing and packing the granular material around said screen or liner means through an opening in the run-in tool; and closing said opening whereby the well can be placed on production without withdrawal of said run-in tool from the well.

22. An apparatus for packing a well with a granular material, the apparatus comprising: sand screen or liner means for retaining sand granular material in said well; run-in tool means for introducing said sand screen or liner means to said well; release means for detachably connecting said sand screen or liner means to said run-in tool means; control means for actuating said release means and for releasing said sand screen or liner means from said run-in tool means at a desired location in said well; delivery opening means for introducing said granular material to said well after actuation of said release means by said control means; and means to close said delivery opening means without withdrawal of said run-in tool means from said well.

4,018,285

METHOD FOR CONTROLLING FINES MIGRATIONS

Larry A. Watkins, Houston; John W. Graham, Alvin, and William M. Salathiel, Houston, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

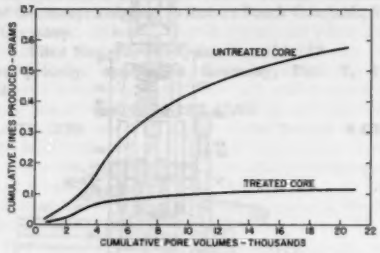
Filed Mar. 19, 1976, Ser. No. 668,557
Int. Cl.² E21B *33/138*
U.S. Cl. 166—295 21 Claims

1. A method for controlling the migration of fine particles in a subterranean formation surrounding a well comprising:

contacting said formation with a dilute resin solution, said resin solution comprising a one-step phenolic type resin dissolved in a diluent, said resin having a concentration of between about 10 and 20 weight percent in said resin solution;

outwardly displacing said resin solution into said formation

so as to leave behind a thin residual resin film in the area of said formation which immediately surrounds said well;



extracting said diluent from said resin film; and

thereafter curing said resin film to an infusible state.

4,018,286

CONTROLLED WELL PLUGGING WITH DILUTE POLYMER SOLUTIONS

James W. Gall, and Everett L. Johnston, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 6, 1975, Ser. No. 629,359
Int. Cl.² E21B *33/138*
U.S. Cl. 166—295 **4 Claims**

1. A method for creating a temporary plug in an underground formation penetrated by at least one wellbore, said method comprising:

1. creating a plug by injecting into said formation a composition comprising:
   a. water,
   b. a polymer capable of gelling in the presence of a crosslinking agent, said polymer selected from the group consisting of polyacrylamides, partially hydrolyzed polyacrylamides, polyacrylonitrile, polyacrylic acid, polyvinylpyrrolidone, polysaccharides, carboxymethylcellulose, other substituted celluloses, polyvinyl alcohol, polystyrene sulfonates, copolymers of acrylamide and acrylic acid or 2-acrylamido-2-methyl-1-propane sulfonic acid.
   c. a complexing agent comprised of multivalent cations selected from the group consisting of Fe^{2+}, Fe^{3+}, Al^{3+}, Ti^{4+}, Sn^{4+}, Ca^{2+}, Mg^{2+}, and Cr^{3+}, and
   d. retarding ions selected from the group consisting of acetate, nitrilotriacetate, tartrate, citrate, tripolyphosphate, metaphosphate, gluconate, and ortho-phosphate; and
2. maintaining a pH of fluids contacting the composition in the formation within the range of about 3 to about 7 for the time desired for temporarily plugging the formation; and
3. thereafter injecting liquid capable of decreasing the pH below 3 or increasing the pH above 7 into contact with said composition.

4,018,287

SOD CUTTING KNIFE WITH SEPARATE SIDE BLADES

Gerardus J. Brouwer, Keswick, Canada, assignor to Brouwer Turf Equipment Limited, Keswick, Canada

Filed Mar. 3, 1975, Ser. No. 554,812
Claims priority, application Canada, Oct. 4, 1974, 210798
Int. Cl.² A01B *45/04*
U.S. Cl. 172—19 **7 Claims**

1. Sod cutting means adapted to be advanced forwardly along a path of travel to sever a strip of sod and comprising:

a. an elongated undercutting blade;

b. a pair of side support arms, one connected to each side of said undercutting blade and each extending upwardly from said undercutting blade, said side support arms having flat inner opposed surfaces oriented parallel to said path of travel, each side support arm having a rear portion having a forward edge, and a forward projection extending forwardly from the upper part of said forward edge and located substantially above said undercutting blade, said projection having a lower edge;

c. a pair of side cutting blades, each side cutting blade having a top edge, a rear edge, and a lower cutting edge slanting upwardly from rear to front, each side cutting blade having a substantially flat inner surface;

d. means detachably mounting said side cutting blades in fixed relation to said undercutting blade with the rear of

each said lower cutting edge being located forwardly of said undercutting blade and with said inner surface of each side cutting blade being aligned with said inner surface of its associated side support arm;

e. said top edge of each side cutting blade abutting against said lower edge of its associated projection and said rear edge of each side cutting blade abutting against said forward edge of the rear portion of its associated side support arm;

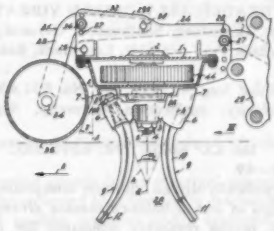
f. said lower edges of said side cutting blades extending, at the rear of said lower edges, substantially below said undercutting blade to protect the connection between said undercutting blade and said side support arms.

4,018,288

ROTARY HARROWS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Feb. 27, 1975, Ser. No. 553,693
Claims priority, application Netherlands, Mar. 1, 1974, 7402788
Int. Cl.² A01B *63/16, 33/12*
U.S. Cl. 172—395 **11 Claims**



1. A rotary harrow comprising a frame and coupling means on said frame for attachment to a prime mover, a plurality of soil working members rotatably mounted on shafts journalled on said frame and driving means connected to rotate said soil working members, said shafts and soil working members extending in a row transverse to the normal direction of travel of the harrow, said soil working members each comprising a support rotatable on a generally vertical shaft and each support being connected to at least one tine that has a lower soil

working portion depending downwardly from said support to contact the ground and trace a general circular path through the soil, screening means mounted on the cultivator and said screening means having an inclined surface that extends across the working width of said row in front of said supports, said screening means terminating above the soil working portion and being positioned to protect said supports, the upper portions of the tines and their support connections from damage by debris encountered in and on the soil during operation while leaving the lower soil working portions of the tines exposed to work the soil, said screening means being a protective roller having a curved surface that faces said supports and said curved surface normally being positioned closely adjacent those supports.

4,018,289
SOIL CULTIVATING TINES

Ary van der Lely, 10, Weverskade, Maasland, and Cornelis Johannes Gerardus Bom, 36, Esdoornlaan, Rozenburg, both of Netherlands

Filed Jan. 6, 1975, Ser. No. 539,036
Claims priority, application Netherlands, Jan. 10, 1974, 7400328
Int. Cl.² A01B *23/02*
U.S. Cl. 172—713 **6 Claims**

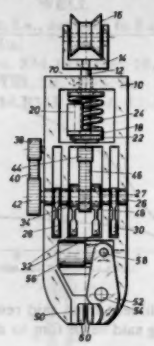
1. A tine for use in a rotary harrow or cultivator comprising an upper fastening portion and a lower elongated soil-working portion that merges into said upper portion at a junction, said soil-working portion tapering downwardly to a tip and at least a majority of its tapering length having a cross-section with a periphery, a segment of that periphery forming an arc with its center of curvature at the longitudinal axis of the soil-working portion, said arc comprising more than half of said periphery and the remainder of the periphery being noncircular and defining a rounded rib, said rib being located at the leading side of the soil-working portion with respect to the normal direction of rotation of said tine.

4,018,290
HYDRAULICALLY DRIVEN VIBRATOR

Paul Schmidt, Lennstadt, Saalhausen, Germany, assignor to Tracto-Technik Paul Schmidt, Lennstadt, Saalhausen, Germany

Filed Aug. 4, 1975, Ser. No. 601,637
Claims priority, application Germany, Sept. 4, 1974, 2442367
Int. Cl.² E02D *7/18*; E21C *3/02*
U.S. Cl. 173—49 **8 Claims**

1. A hydraulically driven vibrator comprising a frame, at least two pairs of out-of-balance masses arranged alongside one another, means rotatably mounting the masses in the frame for rotation about a common axis, means for rotating one pair of masses in one direction, means for rotating the other pair of masses synchronously with said first pair of masses, but in an opposite direction thereto, whereby rotation of said masses produces vibratory forces which are additive in a direction longitudinally of said frame, but are mutually cancelling in a direction transversely of said frame, driving means including a hydraulic motor, means mounting said motor to said frame in a position offset longitudinally of said frame from said common rotational axis, two oppositely rotatable drive outputs of said motor and flexible driving means coupling one of said outputs to one of said pairs of masses and

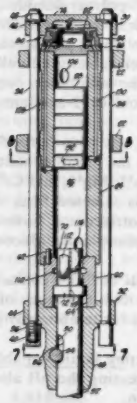


coupling the other of said outputs to the other of said pairs of masses.

4,018,291
PNEUMATIC HAMMER

Jack Anderson, Twinsburg, Ohio, assignor to Allied Steel & Tractor Products, Incorporated, Cleveland, Ohio

Filed Dec. 23, 1974, Ser. No. 535,580
Int. Cl.² B25D *17/12*
U.S. Cl. 173—135 **4 Claims**



1. An air hammer comprising
a body, said body including an elongated cavity;
a ram slidably positioned within said elongated cavity;
inlet means for directing air to said elongated cavity for controlling the position and motion of said ram; and
outlet means for releasing air from said elongated cavity, said outlet means including at least one expansion chamber located in said body adjacent said elongated cavity, said expansion chamber being in communication with said elongated cavity and extending to exhaust from said body into the atmosphere, said expansion chamber being elongated and including ports at each end of said body where said expansion chamber exhausts into the atmosphere.

4,018,292

POWER TOOL WITH DEVICE FOR PREVENTING UNINTENTIONAL TURN-ON OF DRIVE MOTOR

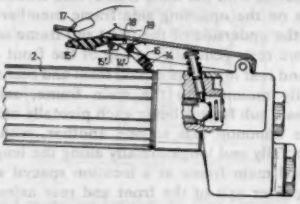
Karl Roll, Leinfelden, and Klaus-Peter Fritschi, Merklingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 12, 1975, Ser. No. 631,188

Claims priority, application Germany, Dec. 7, 1974, 2457944

Int. Cl.² B23B *45/00*

U.S. Cl. 173—170 **4 Claims**



1. In a power tool having a drive motor, in combination, a turn-on switch device activatable for turning on the drive motor; a manual activator mounted for swinging movement in a predetermined plane of motion and in a predetermined direction from a normal position to an activating position in which it activates the turn-on switch device, the manual activator being so arranged and configurated as to be depressible in the predetermined direction by a hand of the user of the power tool; and a safety device for preventing unintentional activator depression including a blocking structure mounted for swinging movement relative to the manual activator in generally the predetermined plane and in the predetermined direction from a blocking position in which it prevents activator depression to an unblocking position in which it permits such depression, the blocking structure being so configurated and located relative to the manual activator as to be depressible by a finger of the same hand which depresses the manual activator, the power tool having a housing, and wherein the blocking structure includes a release lever and a blocking lever interengageable and cooperating with each other and both mounted for swinging movement in generally the predetermined plane, with the blocking lever being mounted to rest against the surface of the housing, the blocking lever being arranged to block activator depression when the release lever is in undepressed position, and the release lever being arranged to prevent the blocking lever from blocking activator depression when the release lever is in depressed position.

4,018,293

METHOD AND APPARATUS FOR CONTROLLED FRACTURING OF SUBTERRANEAN FORMATIONS

Leonard J. Keller, Dallas, Tex., assignor to The Keller Corporation, Dallas, Tex.

Filed Jan. 12, 1976, Ser. No. 648,136

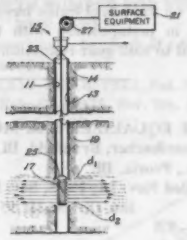
Int. Cl.² E21B *43/117*

U.S. Cl. 175—4.5 **11 Claims**

1. A method of controlled fracturing of a portion of subterranean formations intermediate predetermined depths comprising the steps of:

a. forming a borehole from the surface of the earth to at least the lowest of said predetermined depths so as to allow an explosive charge to be directed against said portion of said formation at said borehole;

b. lowering into said borehole until opposite said portion of said subterranean formation an elongate explosive charge having substantially uniform composition throughout and having a plurality of grooves on its exterior; each of said grooves being deep enough to effect a concentration of explosive forces along the longitudinal axis of said groove so as to effect a fracture extending radially from the center line of the longitudinal axis of said groove; said elongate explosive charge grooves being disposed along one of the following configurations: a plurality of longitudinally extending grooves for effecting vertical fractures along predetermined planes extending radially from the center line of said borehole; and a plurality of peripherally disposed grooves extending peripherally around said elongate explosive charge for fracturing in respective horizontal planes; said peripherally disposed grooves being in planes substantially perpendicular to the center line of said borehole;



c. detonating said explosive charge at only the ambient pressure in said borehole free from superimposed hydraulic fracturing pressure to fracture simultaneously and solely by explosives to the total radial extent desired along said predetermined planes as determined by the nature of said explosive charge and its oriented grooves such that an explosive force in excess of that required to fracture said formation is generated along each plane and said formation is fractured in the respective planes extending radially out-wardly from said borehole.

4,018,294

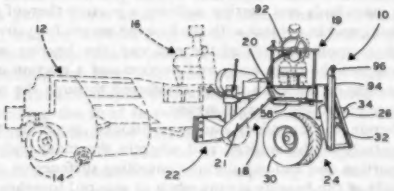
DRAFT ATTACHMENT FOR WHEELED IMPLEMENTS

Everett V. Rankins, 329 Flores Court, Manteca, Calif. 95336, and Raymond Keith Foster, P.O. Box 1, Madras, Oreg. 97741

Filed Dec. 17, 1975, Ser. No. 641,617

Int. Cl.² B62D *61/08*

U.S. Cl. 180—13 **5 Claims**



1. An improved draft attachment for a wheeled implement comprising:

A. an elongated vehicle frame of a rigid, segmented configuration characteried by a forwardly extended, horizontally oriented leading segment and a rearwardly extended,-downwardly inclined trailing segment;

B. means for imparting vertical and lateral stability to the vehicle frame including an implement coupling mounted on the trailing segment adapted to rigidly connect the vehicle frame to a wheel-stabilized implement;

C. an operator's platform mounted above the longitudinal axis of the leading segment of the vehicle frame in fixed relation therewith; and

D. hydraulic drive means for propelling said attachment including an angularly displaceable, hydraulically driven

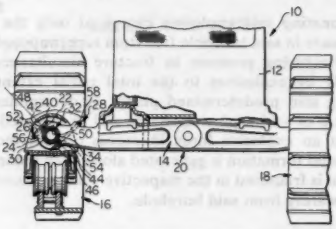
steering assembly coupled to the leading segment of the vehicle frame in a supporting relationship therewith and adapted to oscillate about a turning axis disposed in a vertically oriented plane transversely related to the longitudinal axis of the vehicle frame, including a wheel frame pivotally connected to the leading segment of the vehicle frame, a ground wheel having an axis of rotation disposed in trailing relation with said turning axis, a gear reduction unit mounted on the wheel frame having a rotary output coupling including a wheel mounting ring concentrically related to the ground wheel and connected thereto in a driving relationship therewith, and a hydraulic motor mounted on the wheel frame having a rotary output shaft disposed in juxtaposition with the ground wheel and connected to said gear reduction unit.

4,018,295

VEHICLE EQUALIZER BAR MOUNTING MEANS

Roland E. Hasselbacher, Brimfield, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 14, 1975, Ser. No. 631,965
Int. Cl.² B62D *55/00*
U.S. Cl. 180—9.5 **15 Claims**



1. In a vehicle having a main frame and a track frame;
an equalizer bar comprising a main body pivotally fixed to the main frame and defining a main body end portion;
said equalizer bar further comprising an end cap removably secured to the main body end portion;
bearing means mounted to said track frame, the main body end portion and end cap generally surrounding the bearing means when so secured together, so that the equalizer bar is pivotally connected to the track frame;
the main body end portion defining a portion thereof overlying and in contact with the bearing means for providing that, upon removal of the end cap, the bearing means support the main body end portion and a portion of the weight of the main frame transferred through the equalizer bar to the bearing means,
Wherein the equalizer bar is positioned generally transversely of the vehicle, and wherein the main body end portion and end cap define contacting surfaces on either side of the bearing means when so secured together, said contacting surfaces being substantially aligned and being disposed along a line substantially 45° from a transverse axis of the vehicle.

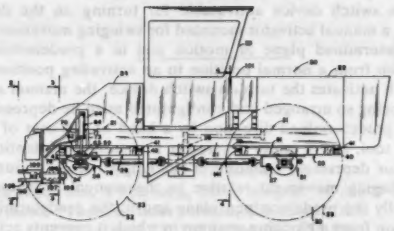
4,018,296

FOUR WHEEL TRACTOR

Jerome Leslie Knudson, Crosby, N. Dak. 58730

Continuation of Ser. No. 457,380, April 19, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,840
Int. Cl.² B60G *25/00*
U.S. Cl. 180—41 **1 Claim**

1. A self leveling tractor comprising an elongated fixed main frame having a motor and cab mounted thereon, rear and front sub frames, said rear and front sub frame being positioned centrally and lengthwise below the rear and front portions respectively of the main frame, said sub frames each having opposing longitudinal side frame members parallel to the length of the main frame and front and rear lateral frame members perpendicular to the length of the main frame, with the longitudinal side frame members being of greater length than the front and rear lateral frame members, so that the length of the sub frames in parallel to the length of the main frame, projecting lug means on opposing side frame members of the rear sub frame projecting outwardly from beneath the main frame to fix a rear axle to the underside of the rear frame so that the rear sub frame rests generally on top of the rear axle, and spaced below the main frame when the rear sub frame is horizontal with the main frame, said front sub frame having means on the opposing side frame members to fix a front axle to the underside of the front sub frame so that the front sub frame rests generally on top of the front axle, said lateral front and rear members of said front and rear sub frame being pivotally mounted to the main frame, said pivotal mounting of said sub frames being each pivotally mounted on generally one common axis to one another, with the axis extending centrally and longitudinally along the length of the sub frames and main frame at a location spaced above the longitudinal center axis of the front and rear axles with the



distance between the pivot points of the front and rear lateral members of the front and rear sub frames greater than the distance between the front and rear edge of their respective axles at the center of the axle, said rear sub frame being spaced above an input shaft to said rear axle, so that a drive shaft means may connect said motor to said rear axle that will pass beneath said rear sub frame member, said front sub frame member being spaced above an input shaft to said front axle so that a drive shaft means may connect said motor to said front axle that will pass beneath said front sub frame member, a fluid cylinder positioned above one of the side frame members on the rear sub frame with one end pivotally connected to the upper surface of said frame member and the other end extending upward and pivotally mounted to an opposing side portion of the main frame, motor and pump means to activate said cylinder, mercury activated leveling means to control the actuation of said valve and pump means to control the activation of said cylinder, with said cylinder when activated by said mercury activated leveling means pivoting said main frame relative to said rear sub frame to level the main frame to horizontal, when said rear sub frame has pivoted to one side or another due to being located on angular terrain.

4,018,297

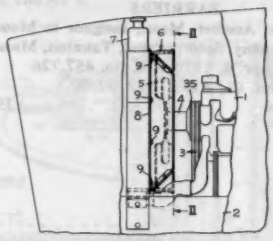
FOUR-PIECE FAN SHROUD

Robert C. Haupt, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 3, 1975, Ser. No. 628,522
Int. Cl.² B60K *11/02*
U.S. Cl. 180—54 A **10 Claims**

1. A multiple-piece fan shroud for use on a motor vehicle having a radiator and belt driven fan with tips passing closely adjacent the inner periphery of the shroud comprising, at least three individually formed sections of a shroud with each section defining diverging external surfaces forming the external surfaces of the shroud when assembled said diverging external

surfaces adapting each of said sections for removal of the section without interference from a two-piece die each section including a mounting portion defining a mounting flange on the forward portion of the shroud having a linear edge adapted for mounting on a radiator, a venturi portion integral with the mounting portion defining a restricting throat segment converging radially inward at least along a major portion of said



section and providing laminar air flow through the intermediate portion of the shroud, arcurate diffuser on the rearward portion of the shroud and intergral with said venturi portion for quiet discharge of air, aligning means and fastening means for connecting the sections of the shroud to form a rectangular front mounting portion and circular rear discharge portion adapted for providing a laminar air flow structure for operating in conjunction with a fan.

4,018,298

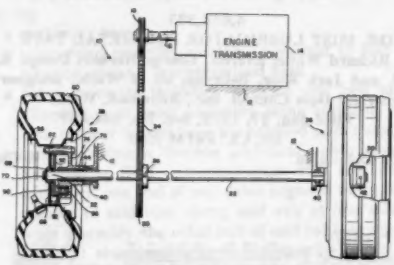
WHEEL ASSEMBLY WITH SLIP CLUTCH

Ray D. Frazee, Shelbyville, Ind., assignor to Carlisle Corporation, Cincinnati, Ohio

Filed Oct. 23, 1975, Ser. No. 624,864

Int. Cl.² B60K *23/06*

U.S. Cl. 180—76 **5 Claims**



1. Wheel and axle assembly for a small vehicle such as a riding lawnmower including a frame and an engine mounted upon said frame, said assembly comprising an axle having opposite first and second ends, means for journal mounting said axle for rotation on said frame, means for drivingly connecting said engine to said axle, first and second wheels for mounting, respectively, on said first and second axle ends, in which the improvement comprises means for rigidly connecting said first wheel to said frist axle end for rotation therewith, said second wheel including a rim housing journal mounted on said second axle end for rotation relative to said axle, said rim housing including a rim flange having a concentric central portion and a shell member adjacent said central portion and defining with said central portion a space, and means for fastening said shell member to said central portion, a plate within said space attached to said axle for rotation therewith, said plate having opposite sides and being axially shiftable on said axle, and means for providing a torque-limited driving connection between said plate and said rim housing, said torque-limited connecting means permitting relative rotation between said second wheel and said axle when a predetermined torque level is exceeded, said torque-limited connecting means including a plurality of first friction pads carried by said flange central portion and engaging one side of said plate and a plurality of second friction pads carried by said shell member and engaging the opposite side of said plate, and spring means for urging said second pads against said plate, said fastening means being operative to preload said spring means.

4,018,299

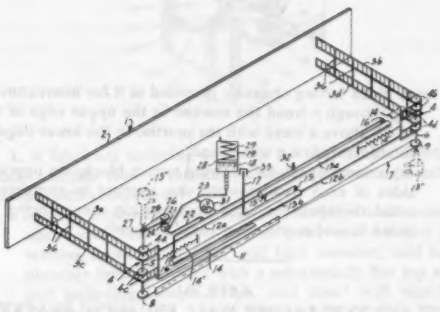
DECELERATING SAFETY BUMPER FOR VEHICLES AND THE LIKE

Tony Nagin, Jr., and Tony Nagin, Sr., both of 14016 S. Indiana Ave., Riverdale, Ill. 60627

Division of Ser. No. 330,616, Feb. 8, 1973, Pat. No. 3,874,718. This application Feb. 27, 1975, Ser. No. 553,618

Int. Cl.² B60R *19/02*

U.S. Cl. 180—91 **28 Claims**



1. A bumper structure, particularly for vehicles, comprising an extendible and retractable bumper member adapted to receive impact loads applied thereto in a predetermined direction, means for supporting said bumper member in operative position to receive such loads, and move in a predetermined direction in response thereto, shock absorbing means operatively connected to said supporting means whereby compression forces thereon in retracting directon are transmitted to said shock absorbing means, said shock absorber means having a pair of ports therein, one of which functions as a fluid inlet, and the other a fluid outlet when the shock absorber means is subjected to loads, a fluid passageway operatively connecting the fluid inlet and outlet ports, and a metering valve structure disposed in said connecting passageway for controlling the fluid flow therein, and means for selectively effecting predeterined extension and retraction of said bumper member in the absence of impact loads thereon, said retraction and extension means comprising a power unit mechanically connected to said supporting means, a bypass passageway shunting said first mentioned passageway for effecting free flow between the fluid inlet and outlet, and valve means for selectively directing fluid through said bypass passageway when said power unit is actuated.

4,018,300

STAIRS

Gilbert Louis Geay, Cours, France, assignor to Menuiserie du Val de Rhins R. Boucher S.A., France

Filed Feb. 12, 1975, Ser. No. 549,147

Claims priority, application France, Feb. 26, 1974, 74.06751

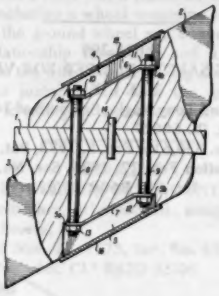
Int. Cl.² E04F *11/00*

U.S. Cl. 182—178 **11 Claims**

1. A stairway comprising a plurality of treads, a plurality of spacer blocks,

each tread being gripped at one of its side edges between two spacer blocks functioning as stringers,

each spacer block having upper and lower free edges, and a mortise located in each of those free edges, the mortise in the lower edge of a block located under a tread and the mortise in the upper edge of an adjacent block located above said tread being symmetrically positioned in relation to the tread,



each block having channels provided in it for interconnecting through a tread the mortise in the upper edge of the block above a tread with the mortise in the lower edge of the block below a tread, and,

compression means for drawing spacer blocks on opposite sides of each tread toward one another to compress a tread therebetween, said compression means being located in said mortises and said channels.

4,018,301

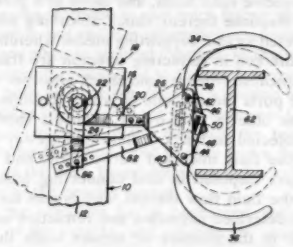
CLAMP TYPE LADDER WALL ENGAGING BRACKET

Alfred E. Nameche, 407 N. West St., Lima, Ohio 45801

Filed July 27, 1976, Ser. No. 709,164

Int. Cl.² E06C *1/36, 7/48*

U.S. Cl. 182—206 **7 Claims**



1. A ladder support bracket assembly, said assembly including elongated support arm means, mounting means for attachment to the upper end of a ladder to be leaned toward and supported from a support structure, said mounting means including pivot means pivotally supporting one end of said support arm means from said mounting means for swinging about a horizontal axis, said mounting means including mounting structure for support from an associated ladder including opposite side rails with said horizontal axis extending transversely of said rails and generally paralleling a plane containing said rails, the free end portion of said arm means including first and second jaw means shiftably supported from said arm means for movement relative thereto toward and away from each other to clamp said support structure therebetween, link means operatively connected to said jaw means at one end and adapted for connection with said ladder at the other end for shifting said jaw relative to said support arm means in response to swinging oscillation of said support arm means relative to said mounting means.

4,018,302

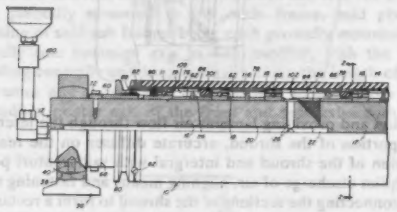
LIQUID-LUBRICATED ROLL WITH ANTI-FLOODING BARRIERS

Richard P. Brown, Assonet, Mass., assignor to Mount Hope Machinery Company, Incorporated, Taunton, Mass.

Filed Apr. 4, 1974, Ser. No. 457,726

Int. Cl.² F16N *7/32, 31/00*

U.S. Cl. 184—6.26 **35 Claims**



1. A liquid lubricated roll comprising

axle means having longitudinal curvature parallel to an axial plane thereof, and adapted to be mounted with said passageway on opposite sides of said barrier ring, together with a centrifugally-operable valve means constructed and arranged to close said duct during non-rotation of said roller means, and to open fluid communication through said duct during rotation of said roller means.

4,018,303

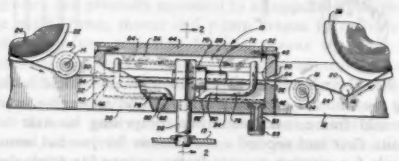
OIL MIST LUBRICATOR FOR METAL TAPE

James Richard White, Everett; George Herbert Dodge, Kirkland, and Jack Rose, Bellevue, all of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Jan. 27, 1975, Ser. No. 544,487

Int. Cl.² F01M *1/00*

U.S. Cl. 184—6.26 **6 Claims**

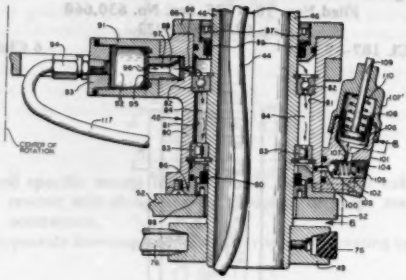


1. In a tape lubricating apparatus having a base, a housing having a plenum chamber therein, means for passing a stretch of tape through said plenum chamber, an oil mist generator carried by said base, nozzle means connected to said generator and having a discharge opening pointing toward one surface of said tape for directing oil mist onto said surface, hood means for substantially encircling said tape in the vicinity of said nozzle means, means for drawing off condensate and excess oil mist from said chamber to prevent contamination of the atmosphere surrounding the apparatus, and said last-named means has two tubes, each tube having an opening positioned close to the bottom wall of the chamber near the midportion of said bottom wall, and suction means connected to said tubes for drawing said condensate and mist.

4,018,304
LUBRICATION SYSTEM FOR A CENTRIFUGAL LIQUID PROCESSING SYSTEM

Houshang Lolachi, and Herbert Goldsmith, both of Rockville, Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,513
Int. Cl.² F16N 9/02
U.S. Cl. 184—7 R **12 Claims**



1. A lubrication system for a bearing assembly of the type operable within a centrifugal force field and including at least one bearing adapted to receive a fluid lubricant, said system comprising, in combination:

means including a reservoir for containing a quantity of said lubricant;

means including an accumulator for storing a quantity of said lubricant under pressure;

means defining a first flow path for said lubricant when said bearing assembly is subjected to said force field from said reservoir through said bearing to said accumulator; and

means defining a second flow path from said accumulator to said reservoir when said bearing is not subjected to said force field.

7. In a centrifugal liquid processing apparatus of the type having

a stationary base;

a rotor drive assembly rotatably mounted to said base for rotation about a predetermined axis;

a rotor assembly including at least one cell processing chamber, said rotor assembly being rotatably mounted with respect to said base for rotation about said axis;

means including a flexible umbilical cable segment for establishing fluid communication with said processing container, one end of said cable segment being fixed with respect to said base along said axis at one side of said rotor assembly, the other end of said cable segment being attached along said axis in rotationally locked engagement to the other side of said rotor assembly;

guide means for causing said umbilical cable segment to rotate about said axis with said rotor drive assembly, said guide means including a housing, a hollow guide sleeve for receiving said umbilical cable, and a bearing assembly including at least one bearing for rotatably mounting said guide sleeve to said housing at a location radially spaced from said axis, said bearing assembly being subjected to a centrifugal force field; and

drive means for rotating said rotor assembly and said rotor drive assembly in the same direction with a speed ratio of 2:1 to prevent the umbilical cable from becoming twisted during rotation of said rotor;

a lubrication system for said bearing assembly comprising, in combination:

means including a reservoir for containing a quantity of lubricant in fluid form;

means including an accumulator for storing a quantity of said lubricant under pressure;

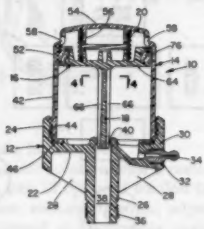
means defining a first flow path for said lubricant when said bearing assembly is subjected to said force field from said reservoir through said bearing to said accumulator; and

means defining a second flow path from said accumulator to said reservoir when said bearing is not subjected to said force field.

4,018,305
LUBRICANT METERING ASSEMBLY

Helmut G. Tietje, Woodcliff Lake, N.J., assignor to Lube Systems Corporation, Saddle Brook, N.J.

Continuation of Ser. No. 295,819, Oct. 10, 1972, abandoned.
This application Feb. 24, 1975, Ser. No. 552,725
Int. Cl.² F16N 11/04
U.S. Cl. 184—45 R **3 Claims**



1. A lubricant metering assembly for supplying a substantially constant flow of lubricant to an apparatus to be lubricated which comprises:

a housing including a base member, an outer wall element about said base member and an inner wall member extending downwardly from said base member, said base member being provided with a substantially flat top wall and including thread means, said inner wall member having a lubricant supply passageway formed therethrough with an upper portion thereof of reduced cross-sectional area thereby forming a guide means, said top wall of said base member of said housing being provided with an upwardly extending cylindrically shaped section forming a channel with said outer wall to receive a sealing ring; said top wall being provided with a concentric rib within said channel;

a cylindrical lubricant container comprised of an end wall and side wall positioned within and mounted to said housing, said container having at least one orifice about said end wall, said end wall being provided with a downwardly extending positioning means, said side wall being provided with thread means and a downwardly extending rib formed on lower terminal portion thereof;

a sealing ring compressively disposed in said channel of said base member between said base member and terminal portion of said end wall of said container;

a piston including a downwardly extending stem, said piston being provided with peripheral seal means for contacting the interior surface of the side wall of said container and an upwardly extending positioning means, said stem being cylindrically-shaped and in contacting relationship with said guide means with a spacing of less than 0.010 inches, said stem being provided with at least one exterior channel of increasing cross-sectional area as measured upwardly from the lower terminal portion of said stem, said piston being formed with a substantially flat bottom wall which cooperates with said flat top wall of said base member thereby minimizing the amount of lubricant remaining in said assembly upon completion of travel of said piston with the travel distance of said piston being greater than 35 percent of the overall height of the assembly; and

a coil spring disposed between and about the positioning means of said container means and said positioning means of said piston, said spring having decreasing com-

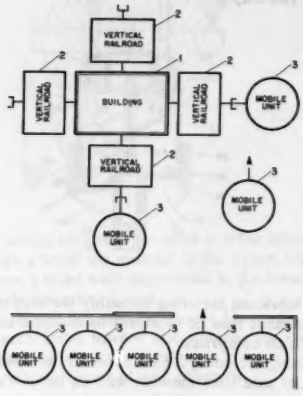
pressional force compensated by a passageway of increasing cross-sectional area formed by said channel and said guide means to permit substantially constant flow of lubricant.

4,018,306

EMERGENCY BUILDING ACCESS APPARATUS

Merlyn E. Lyons, 44-022 Aina Moi Place, Kaneohe, Hawaii 96744

Continuation-in-part of Ser. No. 469,622, May 13, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 554,462
Int. Cl.² B66B 9/00
U.S. Cl. 187—6 **15 Claims**



7. An emergency building access apparatus for evacuating the occupants of the building and to provide access for firemen, which apparatus is self-powered by a portable power plant but dependent structurally upon the building comprising:

a. a vertical railroad comprising:
1. a vertical rail assembly;
2. a supporting means attaching the vertical rail assembly to the building in a generally vertical position;
3. emergency access openings providing access between the building interior and railroad;

b. a mobile unit operatively connected to the vertical railroad comprising:
1. a railcar for carrying people;
2. a means to slidably engage the railcar with the vertical railroad for vertical motion thereon;
3. a power source;
4. a control means in the railcar to cause the railcar to rise, lower, and stop on the vertical railroad;
5. a coupling means to join the mobile unit to the vertical railroad; and

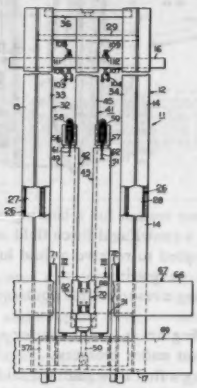
c. a railcar position control means comprising:
1. a mechanically driven hoist;
2. supporting means attaching the hoist to the building for an operative relationship with the vertical rail assembly;
3. a hoist rope depending from the hoist and operatively connected thereto;
4. a means to operatively connect the railcar to the hoist rope so that operation of the hoist will raise, lower, or stop the railcar on the vertical railroad;
5. a mechanical power inlet fitting operatively connected to the hoist;
6. a means to operatively connect the power source to the mechanical power inlet fitting for operation of the hoist by the power source;
7. an electrical hoist control means operatively connected to the mechanically driven hoist for causing the hoist to start, stop, and reverse; and
8. a means to operatively connect the control means in the railcar with the hoist control means.

4,018,307

MECHANICAL AND HYDRAULIC INTERCONNECTION FOR CLUSTERED HYDRAULIC CYLINDERS

Benonie C. Ehrhardt, Park Forest; Dean A. Matthews, Homewood, and Walter A. Pivarunas, Calumet Park, all of Ill., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 10, 1975, Ser. No. 630,660
Int. Cl.² B66F 9/22
U.S. Cl. 187—9 E **6 Claims**



1. In combination a cluster of three hydraulic cylinders associated with the load carriage elevating and mast structure elevating functions of a fork lift truck, including a centrally disposed hydraulic cylinder and a pair of oppositely disposed hydraulic cylinders symmetrically positioned contiguous said centrally disposed hydraulic cylinder, a separate attachment block rigidly secured to the outer surface of each of the respective hydraulic cylinders, a hydraulic passage in each attachment block communicating with a hydraulic passage through the wall of its corresponding hydraulic cylinder, an interconnecting block adapted to interface with each of the three attachment blocks, said interconnecting block including hydraulic manifolding means whereby to hydraulically interconnect said hydraulic cylinders through said interconnecting block when said interconnecting block is in interfaced relation with the attachment blocks of said three hydraulic cylinders, and detachable fastening means securing said interconnecting block to the attachment blocks of said three hydraulic cylinders whereby to detachably connect each of the three cylinders of said cluster to said interconnecting block.

4,018,308

ELEVATING BY SHAPE MEMORY INDUCTION

Neil E. Rogen, 3 Beaver Dam Road, Upper Saddle River, N.J. 07458

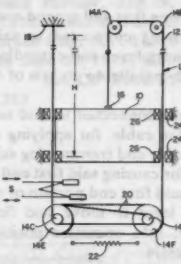
Filed Oct. 23, 1975, Ser. No. 625,322
Int. Cl.² B66B 11/04
U.S. Cl. 187—17 **3 Claims**

1. Elevating apparatus comprising,

means defining an elevator load member for cyclically travelling a limited vertical path,

means defining a shape memory cable carrying and suspending said elevator load and comprising cabled wires of an alloy comprising at least one metal selected from the group consisting of nickel, iron and cobalt and further comprising titanium,

the weight of the elevator load being sufficient to elongate said cable at a first relatively cold temperature,



and specific means for electrically heating said cable to reverse said elongation by induction of shape memory contraction,

to provide lowering and raising portions of elevating cycles.

4,018,309

DISC BRAKE AND LOCKING MEANS THEREFOR

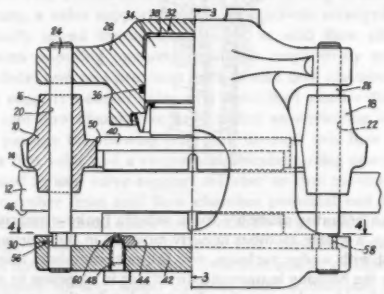
Jean-Claude Mery, Pavillons sous Bois, France, assignor to Societe Anonyme D.B.A., Clichy, France

Filed Oct. 10, 1975, Ser. No. 621,439

Claims priority, application France, Oct. 30, 1974, 74.36265

Int. Cl.² F16D *55/18*

U.S. Cl. 188—72.4 **5 Claims**



1. A disc brake comprising:

a disc having two friction faces;

a torque taking member disposed adjacent the disc;

a caliper slidably mounted by way of at least one column on said torque taking member;

actuating means cooperating with the caliper to urge a first friction element into engagement with one face of the disc and a second friction element, by reaction, into engagement with the other face of the disc;

locking means axially fixing said caliper relative to the one column;

said locking means comprising a portion of the second friction element in engagement with a portion of the one column to axially secure the caliper to the one column.

4,018,310

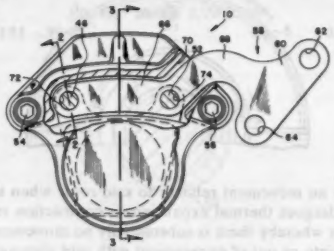
DISC BRAKE

Irving R. Ritsema, and James J. Colpaert, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed Mar. 15, 1976, Ser. No. 666,835

Int. Cl.² F16D *55/224*; B62L *1/00*

U.S. Cl. 188—73.3 **6 Claims**



1. In a disc brake for a vehicle:

a rotor mounted for rotation with a member to be braked and having a pair of opposed friction faces;

a pair of friction elements carried adjacent said friction faces and adapted to frictionally engage said opposed friction faces when a brake application is effected;

a torque member secured to a non-rotative portion of the vehicle;

a pair of pins carried by said torque member and restrained against relative movement with respect thereto, said pins being circumferentially spaced and extending axially with respect to said rotor, said friction elements being slidably mounted on said pins;

a caliper carried by said torque member, said caliper having a pair of inwardly extending portions disposed adjacent said friction elements for urging the latter into braking engagement with their corresponding friction faces, said caliper further including a bridge portion traversing the periphery of said rotor and interconnecting said inwardly extending portions, and fluid motor means carried by the caliper for effecting a brake application;

each of said inwardly extending portions defining corresponding bores therein located radially outwardly of said periphery of the rotor, the bores in one of said inwardly extending portions registering with corresponding bores in the other portion, said registering bores receiving opposite ends of said pins;

said caliper including at least two separate pieces; and

means for holding said caliper together;

said means for holding said caliper together being separate from said pin means.

4,018,311

ROTOR AND BRAKING RING DISC ASSEMBLY

Colin John Frederick Tickle, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed Nov. 13, 1975, Ser. No. 631,638

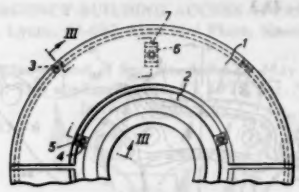
Claims priority, application United Kingdom, Dec. 20, 1974, 55217/74

Int. Cl.² F16D *65/12*

U.S. Cl. 188—218 XL **11 Claims**

1. A railway disc brake assembly comprising a rotor, a braking ring comprising a plurality of arcuate segments, and means attaching said ring to said rotor in a manner permitting thermal expansion and contradiction of said ring relative to said rotor, said attaching means including anchor means for preventing circumferential movement of said ring relative to said rotor and first and second pairs of circumferentially spaced abutment means on said rotor for each of said segments engaging each of said segments only at first and second pairs of circumferentially spaced locations so as to prevent

radially outward and inward movement of each of said segments relative to said rotor at said locations, the first and second circumferentially spaced locations being selected so that said abutment means engage each of said segments at those circumferentially spaced positions thereof having substantially no movement relative to said rotor when said segement undergoes thermal expansion or contraction relative to said rotor whereby there is substantially no movement by said segment into or out of engagement with said abutment means when said segment undergoes said thermal expansion or contraction.

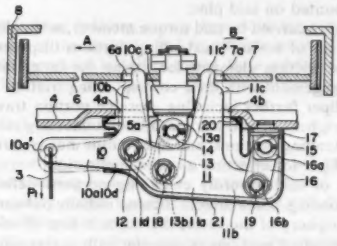


4,018,312

DUO-SERVO PARKING BRAKE

Ikuo Muramoto, and Hideki Kita, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Dec. 30, 1975, Ser. No. 645,474
Int. Cl.² F16D 51/22
U.S. Cl. 188—333 **5 Claims**



1. A duo-servo parking brake system for an automotive wheeled vehicle, said system comprising:

a rigid brake support means;

a drum rotatably mounted adjacent said support means and having coaxially positioned therearound a wheel unit;

first and second brake shoes movably supported by said support means within said drum and normally urged to inoperative positions out of contact with said drum, said first and second shoes being connected to each other at first adjacent ends thereof, each said shoe having an opening therethrough;

an anchor pin fixedly mounted on said support means at a position between second adjacent ends of said first and second shoes;

a link assembly comprising:

a. a primary lever having first and second end portions, said first end portion extending through said opening in said first shoe;

b. a secondary lever having a base portion rotatably connected to said primary lever and a leg portion having a first end portion extending through said opening in said second shoe and a second end portion fixed to said base portion; and

c. first and second link lever means, each having a first end rotatably connected to said support means and a second end rotatably connected to said base portion of said secondary lever, said first and second link lever means being spaced in the longitudinal direction of said base portion, for supporting and guiding said secondary lever;

an actuation cable having first and second end portions, said first end portion being connected to said second end portion of said primary lever and extending therefrom in a direction generally parallel to an axis of rotation of said drum; and

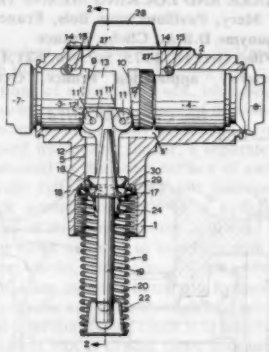
brake actuation means, connected to said second end portion of said actuation cable, for applying a pulling force on said actuation cable and transmitting said force to said link assembly and for causing said first end portion of said primary lever and said first end portion of said leg portion of said secondary lever to move said first and second shoes, respectively, into operative positions thereof in contact with said drum.

4,018,313

VEHICLE BRAKE WEDGE ACTUATOR ASSEMBLIES

John Hart, Solihull, and Clifford John Pride, Lapworth, both of England, assignors to Girling Limited, Birmingham, England

Filed June 18, 1975, Ser. No. 587,841
Claims priority, application United Kingdom, June 18, 1974, 26852/74
Int. Cl.² F16D 51/62
U.S. Cl. 188—343 **8 Claims**



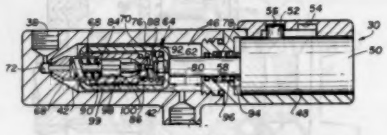
4. An actuator assembly for a vehicle brake comprising a housing, a wedge member linearly movable in the housing and formed with wedge surfaces, two follower members displaceable in the housing in opposite directions in response to movement of said wedge member for applying friction means into braking engagement with a rotor, said follower members being formed with surfaces inclined to each other and arranged one on each side of said wedge member, at least one roller interposed between each of said inclined surfaces and a respective one of said wedge surfaces, and a cage in which said rollers are retained as a cage assembly not captive to said wedge member, wherein said housing is provided with means defining an asymmetrical aperture through which said wedge member is inserted during assembly of the wedge member into the actuator housing, said wedge member having a larger end of which the transverse cross-sectional shape is complementary to that of said aperture, whereby insertion of said wedge member into the housing is prevented by baulking between said means and said wedge member when said wedge member is angularly misorientated about its axis of linear movement.

4,018,314

ANTI-THEFT VEHICLE BRAKE-SUPERVISING DEVICE

Raymond Richmond, 249-20 Thornhill Ave., Little Neck, N.Y. 11362; Edward Parmer, 118 N. Waldinger St., Valley Stream, N.Y. 11580, and Edward G. Parmer, Jr., 167 Caroline Ave., Garden City, N.Y. 11530

Filed June 30, 1976, Ser. No. 701,094
Int. Cl.² B60R 25/08
U.S. Cl. 188—353 6 Claims



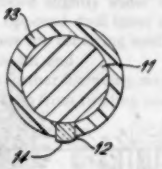
1. In an anti-theft vehicle brake-supervising device of the type which selectively prevents reverse flow of fluid from at least one vehicle wheel cylinder back to the vehicle master cylinder to thereby maintain the braking function of said fluid within said wheel cylinder, the improvement comprising means defining a flow chamber having opposite distal and proximal ends, a first and a second fluid connection respectively connected from said flow chamber distal end to said vehicle master cylinder and from said flow chamber proximal end to said wheel cylinder to normally allow opposite direction fluid flow between said master cylinder and wheel cylinder through said flow chamber, means defining a main valve opening including a seat in said flow chamber distal end for selectively interrupted to prevent flow between said first and second fluid connections incident to the closing of said valve opening, a valve support member operatively arranged to be manually urged through movement in said flow chamber between opposing operative positions respectively adjacent said distal and said proximal ends of said flow chamber, said valve support member being of a prescribed smaller diameter than said flow chamber so as to define an encircling annular fluid passage for allowing fluid flow through said flow chamber, a first valve and a cooperating biasing spring operatively disposed in said valve support member so that movement of said member from said flow chamber proximal end to said flow chamber distal end correspondingly urges said first valve through closing movement upon said valve seat and only allows directional flow of fluid from said master cylinder fluid connection to said wheel cylinder fluid connection to the extent of opening movement permitted in said first valve relative to said valve opening by said biasing spring, means in said first valve defining an internal flow passage having a pressure release valve opening, a second valve normally closing said pressure release valve opening, and valve-unseating means on said valve support member effective to unseat said second valve incident to further movement of said member towards said flow chamber distal end so as to release pressure fluid from said flow chamber proximal end through said second valve and into said master cylinder through said first fluid connection thereof, whereby the aforesaid release of pressure fluid facilitates the manual urging of said valve support member through movement back to said flow chamber proximal end and the corresponding opening of said main valve for normal use of said fluid for braking service for said vehicle.

4,018,315

INSULATED RUNNER FOR USE IN OVERHEAD ELECTRIC TRACTION SYSTEMS

Stanley Harold Russell Proud, Marlow, England, assignor to BICC Limited, London, England

Filed Dec. 30, 1975, Ser. No. 645,332
Claims priority, application United Kingdom, Dec. 31, 1974, 56248/74
Int. Cl.² B60M 1/18, 5/00
U.S. Cl. 191—39 16 Claims



1. An insulated runner for use in an overhead electric traction system comprising at least one elongate reinforcing body of high tensile modulus and high tensile strength made at least substantially of insulating material and provided with metal terminal fittings, and at least one body of abrasion-resistant ceramic or vitreous material which is associated with, and extends lengthwise between the terminal fittings of, the reinforcing body and which provides an effective running surface, the outermost surface of the insulated runner between its terminal fittings being of an insulating material that is resistant to tracking.

4,018,316

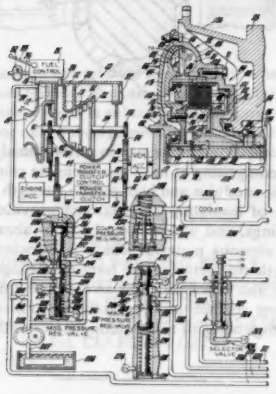
ENGINE AND TRANSMISSION POWER TRAIN

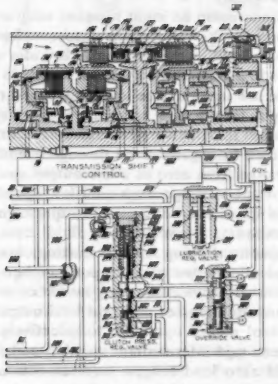
Ted M. McQuinn, Carmel, and Richard B. Anderson, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 7, 1974, Ser. No. 448,991
Int. Cl.² F16H 39/00, 47/08
U.S. Cl. 192—3.3 13 Claims

1. In a transmission an input member adapted to be driven by an engine and having net input torque from a high idle speed low idle input torque, through a low idle speed high idle input torque to a maximum high input torque in a starting high input torque low input torque low input speed range and then reduced input torque in a large drive input speed range to maximum input speed; an intermediate member; a load output member driven from zero speed through a small starting output speed range from zero to a low output speed and a large drive output speed range from said low speed to maximum drive output speed and having load torque requirements from zero to maximum; a low capacity fluid drive means and a variable capacity slipping friction starting clutch means connected in parallel between said input member and said intermediate member; drive connecting means connected between said intermediate member and said load output member and having control means operative to selectively disestablish a drive between said intermediate member and said load member for said zero load torque requirements and establish a starting drive from said intermediate member to said load output member operative when said load output member is stationary to stall said fluid drive means; said fluid drive means having a low idle speed high idle torque capacity at zero speed ratio stall increasing at a greater rate with input member spaced than input member idle torque to reduce input member idle speed from said high idle speed and regulate said input member speed at said low idle speed and at normal drive torque high speed ratio drive substantially zero torque capacity in said starting high torque low input speed range and maximum torque capacity about equal to said low idle speed high torque capacity at maximum input speed; and said clutch means including clutch control means operative in response to

manual control, when said drive connecting means establishes said starting drive and stalls said fluid drive means, for providing a progressively variable torque capacity from substantially zero torque to lock-up torque equal to the load output member torque requirements beginning substantially to stall at said low idle speed and completed in said starting high torque low input speed range of said input member and said small starting speed range of said load output member up to maximum





clutch torque capacity about equal to said maximum high input torque and simultaneously progressively increasing fluid drive speed ratio from zero speed ratio stall to said high speed ratio drive and progressively reducing torque capacity from substantially said high idle torque capacity to zero torque capacity before lock-up for a starting drive of said load member from stall to a lock-up speed in said small starting speed range of said load output member and in said starting high torque low input speed range of said input member.

4,018,317

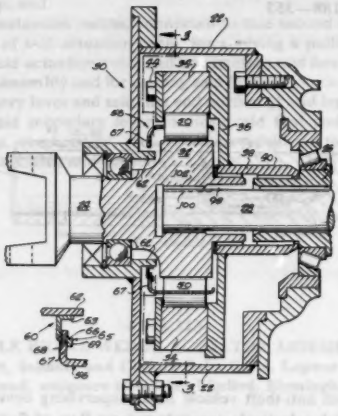
SPIN PROOF TANDEM AXLE DRIVE MECHANISM

Robert William Lemon, Farmington, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 7, 1975, Ser. No. 602,951

Int. Cl.² F16D *13/04*

U.S. Cl. 192—36 **13 Claims**



1. A torque transfer mechanism including an one-way device, said mechanism having an input shaft and a pair of concentric output shafts, said input shaft extending from one side of said device and said output shafts extending from the other side of said device, said output shafts connected to a pair of tandem parallel driving axles for a vehicle, said one-way device including a drive race connected to the input shaft and to one of said output shafts, a driven race connected to the other output shaft, a plurality of wedging elements mounted between said races, whereby torque is normally transmitted to said one output shaft, and said one-way device being responsive to relative rotation between said output shafts to provide for drive to said other output shaft when said one output shaft is rotating faster than said other output shaft.

4,018,318

WEDGING FREE-WHEEL CLUTCH

Karl J. Hallerberg, Plankstadt, Germany, assignor to Borg-Warner, GmbH, Heidelberg, Germany

Filed Dec. 9, 1974, Ser. No. 530,634

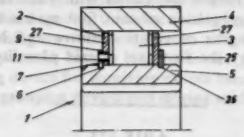
Claims priority, application Germany, Dec. 13, 1973, 2361916

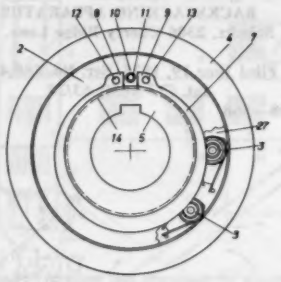
Int. Cl.² F16D *41/07*

U.S. Cl. 192—41 A **7 Claims**

1. A free-wheel clutch having centrifugally disengageable wedging members in which the cage is frictionally connected with the overrunning race, characterized in that the cage has

a positively engageable interlocking connection with at least one retaining ring resiliently gripping the base of a ring groove





in the overrunning race providing frictional connection between said cage and said overrunning race.

4,018,319

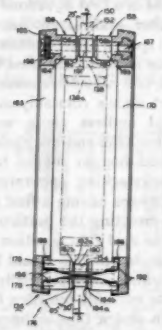
SYNCHRONIZER ASSEMBLY

Robert L. Thomas, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Jan. 28, 1976, Ser. No. 653,058

Int. Cl.² F16D *23/06*

U.S. Cl. 192—53 E **18 Claims**



1. For use in a transmission having a shaft and two axially spaced gears rotatably mounted about the axis of the shaft and with the gears having jaw clutch teeth and friction clutch elements at the facing sides thereof, the combination of a clutch and synchronizer assembly for selectively coupling either of the two gears to the shaft including, a clutch collar member axially slidable on the shaft and mounted for rotation therewith between the gears, said clutch collar member having jaw clutch teeth adapted to cooperate with the jaw clutch teeth on the gears, said collar member having openings formed therethrough parallel to the shaft, axially movable friction clutch members adapted to cooperate with the friction clutch elements on the gears, means rigidly interconnecting said axially movable friction clutch members, said means being adapted to block axial movement of said clutch collar member relative to said axially movable friction clutch members when the latter and said clutch collar members are rotating asynchronously, longitudinally split pin assemblies disposed through the openings in said clutch collar member, said axially movable friction clutch members having recesses formed therein for freely receiving the ends of said split pin assemblies, and resilient means between the portions of said split pin assemblies for spring loading the latter upon initial axial movement of said clutch member relative to said axially movable friction clutch members for effecting snap engagement of the jaw clutch teeth of the clutch collar member with the jaw clutch teeth of the adjacent gear, wherein the improvement comprises:

a. each of said split pin assemblies including a centrally located annular groove slightly wider than said flange, said groove having opposed dual inner and outer ramps;

b. each of said recesses for receiving said split pin assemblies being loop-shaped; and

c. said resilient means further including means for inhibiting said split pin assemblies from twisting and rotating in said loop-shaped recesses.

4,018,320

CLUTCH DISK FOR MOTOR VEHICLE MAIN CLUTCHES

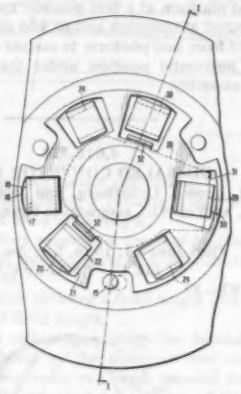
Peter Schrape, Stuttgart, and Günter Wörner, Rommelshausen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Sept. 25, 1974, Ser. No. 509,134

Claims priority, application Germany, Oct. 6, 1973, 2350279

Int. Cl.² F16D *69/00*, *3/14*

U.S. Cl. 192—106.2 **13 Claims**



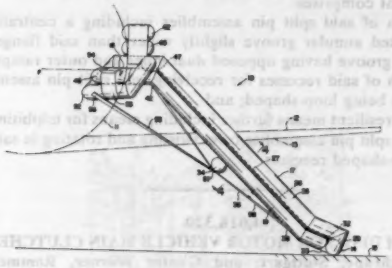
1. In a clutch disk arrangement for motor vehicle main clutches which includes a hub means, friction lining means, a disk means for carrying said friction lining means, means for torsionally elastically connecting said disk means with said hub means including a plurality of spring means having different spring characteristics for producing a multi-stage operation of the clutch disk arrangement, a plurality of window means for respectively accommodating said spring means, separate damping means for damping said plurality of spring means, and control means for controlling the start of operation of at least one damping means, the improvement comprising: said control means including a means for engaging a window means accommodating the spring means for producing a second stage of the multi-stage operation, a separate control spring coordinated to the control means, said separate control spring being mounted in said control means and being prestressed to a predetermined spring force in excess of the force necessary to maintain said control spring in said control means such that the point at which said control means is fully effective is determined exclusively by an equilibrium of the force of the control spring and a friction force effective within an operating stage of the clutch disk arrangement during which said control means is effective.

4,018,321

ESCAPE SLIDE AND PLATFORM ASSEMBLY

John Melvin Fisher, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 21, 1976, Ser. No. 688,748
Int. Cl.² B65G *11/10;* A62B *1/20*
U.S. Cl. 193—25 B 11 Claims



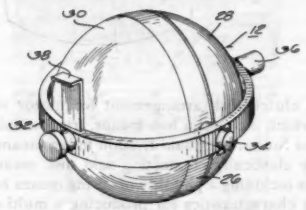
1. An escape slide and platform assembly adapted to be inflated and extend from a supporting structure at an elevated position to a lower surface comprising a generally horizontal platform, an escape slide inclined downwardly from said platform and extending to said lower surface, and an elongated platform supporting tension members means connected at one end to said platform at a first position spaced from said slide and connected at the other end to said slide at a second position spaced from said platform to sustain said platform in said generally horizontal position under the weight of persons using the assembly.

4,018,322

GIMBALED CONVEYOR BALLS

Elwood B. Brown, Cedarburg, and Helmut H. Kropp, Pewaukee, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed June 11, 1976, Ser. No. 695,280
Int. Cl.² B65G *39/02*
U.S. Cl. 193—37 8 Claims



1. Apparatus for the omni-directional movement of objects over the surface of the apparatus comprising

a. a frame;

b. a plurality of substantially parallel, spaced support members secured to said frame; and

c. a plurality of conveyor elements mounted between said support members and providing a support surface for objects being moved over the apparatus, each of said elements comprising

i. first means rotatably mounted to adjacent support members along a first axis substantially perpendicular to the parallel length of the support members,

ii. a hub member rotatably mounted to said element along a second axis lying in approximately the same plane as the first axis,

iii. a plurality of lobes each rotatably mounted to said hub for rotation about a third axis all perpendicular to said second axis, and

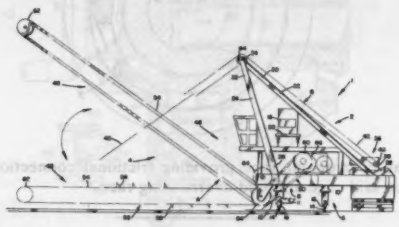
iv. second means associated with each first means for restricting rotation of said first means to a predetermined degree of rotation above and below a plane defined by the first axis of said plurality of conveyor elements.

4,018,323

BACKSTACKING APPARATUS

Edward D. Schultz, 2306 Cherry Ridge Lane, Brandon, Fla. 33511

Filed June 19, 1975, Ser. No. 588,423
Int. Cl.² B65G *65/28*
U.S. Cl. 198—508 9 Claims



1. A backstacking apparatus for stacking and reclaiming bulk particulate material comprising a particulate handling means operatively supported above a supporting surface by a movable positioning means, said particulate means comprising boom means including a first boom member configured to operatively support a rake means and rake drive means, said rake drive means coupled to said rake means to selectively move said rake means in a first or second direction relative to said first boom member, said rake means comprising a pair of substantially parallel spaced apart endless chain means including at least one blade element disposed between said pair of endless chain means, said rake drive means comprising at least one pair of sprocket means rotatably mounted on said first boom member, said endless chain means engaging said sprocket pair to drive said endless chains, said base means further including feed hopper means to supply particulate material to said backstacking apparatus, said feed hopper including a control means having a first and second position, said control means directing the particulate material to said storage zone when in said first position and to said loading zone when in said second position, said base means comprising a platform including a substantially horizontal element having a loading gate movable between first and second positions formed therein and a first inclined element extending outwardly therefrom to the stacking zone such that said rake means when operatively driven in the first direction moves particulate material outwardly from said base for stacking in a stacking zone and when said rake means is driven in said second direction the particulate material is drawn inwardly to said base to move said particulate material from the stacking zone through said loading gate when in said second position to a loading zone.

4,018,324

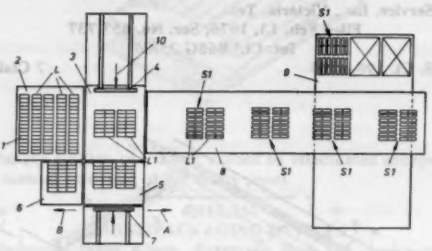
PROCESS AND APPARATUS FOR ARRANGING BRICKS IN SETTING LAYERS OF RECTANGULAR CONFIGURATION

Hermann Kamphues, Laggenbeck, Germany, assignor to C. Keller & Co., Laggenbeck, Germany

Filed Aug. 26, 1975, Ser. No. 607,935
Int. Cl.² B65G *47/26*
U.S. Cl. 198—347 3 Claims

1. In apparatus for arranging unfired bricks in setting layers of rectangular configuration suitable for crosswise stacking of

one layer above another and including a delivery conveyor for carrying transverse rows of bricks, and a grouping device adapted to receive the brick rows from said delivery conveyor, arrange the bricks into compact layers and spread the bricks in predetermined spacing to create setting layers, the improvement comprising two table surfaces adapted for selective alternate movement into a brick transfer position adjacent said grouping device for receiving excess bricks from the brick rows on said grouping device and storing said bricks until their



aggregate number reaches that required for a compact layer, pusher means for selectively moving the excess bricks from said grouping device to the one of said table surfaces which is in the transfer position, and pusher means for selective transferring the stored bricks from the one of said table surfaces which is in the transfer position to said grouping device, said storage table surfaces permitting excess bricks to remain on either one of said table surfaces while the other of said table surfaces is in the brick transfer position.

4,018,325

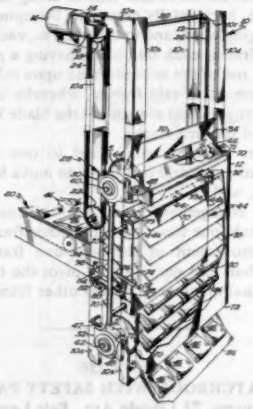
AUTOMATIC PACKAGE ACCUMULATOR

Jack J. Rejsa, Golden Valley, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Oct. 9, 1975, Ser. No. 621,189

Int. Cl.² B65G *43/08*

U.S. Cl. 198—347 **6 Claims**



1. An article accumulator for temporarily storing articles being packaged comprising a supporting framework, two vertical stacks of uniformly spaced apart temporary storage shelves, comprising an incoming stack of shelves and an outgoing stack of shelves, in-feed means operatively associated with the incoming stack to guide the articles coming into the apparatus onto the incoming stack, means operatively associated between the stacks for transferring articles from the incoming stack to the outgoing stack and means operatively associated with the outgoing stack to transfer the first article placed in the outgoing stack out of the apparatus upon a demand signal, the incoming shelves are inclined at an oblique angle with respect to the vertical, temporary stop means is operatively associated with the lower side thereof to prevent the articles from passing off the shelves and a means is provided for establishing relative vertical motion between the temporary stop and the incoming shelves to cause a shelf upon a demand signal to be located above the upper edge of the temporary stop whereby the articles in the incoming stack slide under the influence of gravity to the outgoing stack of shelves.

4,018,326

VARIABLE LENGTH RECIPROCATING CONVEYOR SYSTEM FOR SPACING ARTICLES

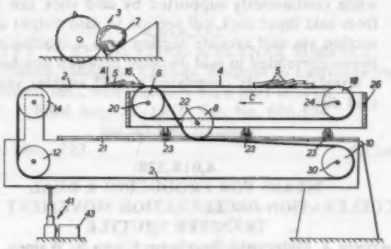
Peter D. Hardy, Welwyn Garden City, England, assignor to The Metal Box Company Limited, Reading, England

Filed Oct. 1, 1975, Ser. No. 618,335

Claims priority, application United Kingdom, Oct. 2, 1974, 42712/74

Int. Cl.² B65G *117/26*

U.S. Cl. 198—461 **8 Claims**



1. A conveyor handling system comprising

a first endless belt defining a variable length wherein the upstream run is of variable length,

a first pair of rollers supporting the first belt and respectively located at the upstream and downstream ends of the upstream run,

a second endless belt defining a fixed length and the downstream run is of fixed length,

a second pair of rollers supporting the second belt and respectively located at the upstream and downstream ends of the downstream run, with the said downstream run being serially arranged downstream of the upstream run defined by the first belt, whereby the two said runs define a predetermined path,

means supporting the downstream roller of the upstream run and the upstream roller of the downstream run for rotation about a common axis, and

means for displacing the supporting means along a line parallel to said predetermined path.

4,018,327

HANGER CONVEYING SYSTEM

Walter P. Goodman, New Albany, Ind., and Laddie A. DePas, Louisville, Ky., assignors to W. M. Cissell Manufacturing Company, Louisville, Ky.

Filed Feb. 18, 1976, Ser. No. 659,161

Int. Cl.² B65G *47/08*

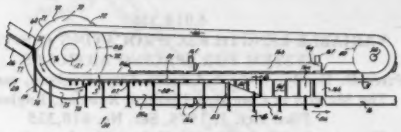
U.S. Cl. 198—723 **11 Claims**

1. Apparatus for feeding hangers with a hook formed of wire having a predetermined diameter comprising:

an elongated stationary slick rail having an input section, an output section, and a concave arcuate section with a specified radius of curvature located intermediate said input and output sections, said input, output and arcuate

sections being stationary and free of hook-impeding obstructions and positioned to permit a hanger hook to be continuously supported thereby and smoothly slide sequentially therealong,

a circular disc having a peripheral edge with notches therein circumferentially spaced at predetermined distances and having a radius substantially equal to said specified radius of said arcuate slick rail section, said disc having an axis of rotation and being rotationally mounted with its peripheral edge overlying and spaced from said arcuate slick rail section a distance less than said hook wire diameter, and



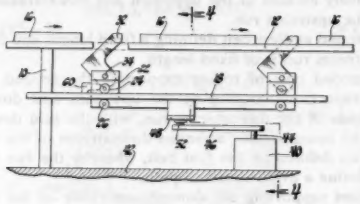
a first drive connected to said disc for rotating it about said axis at a given angular velocity to move said notched disc relative to said arcuate slick rail section for positively slidably transferring hangers engaged in said notches while continuously supported by said slick rail sections from said input slick rail section to said output slick rail section via said arcuate section with a spacing therebetween correlated to said distance between notches and at a transfer velocity correlated to said angular velocity of said disc.

4,018,328

MEANS FOR PRODUCING A DUAL ACCELERATION-DECELERATION MOVEMENT FOR A TRANSFER SHUTTLE

Lawrence A. Galarowic, Dearborn; Glenn B. Waineo, Detroit, and David F. Johnson, Livonia, all of Mich., assignors to Visi-Trol Engineering Company, Detroit, Mich.

Filed Oct. 28, 1975, Ser. No. 626,260
Int. Cl.² B65G *25/08*
U.S. Cl. 198—741 **9 Claims**



1. In a machine for transferring a work piece transfer member along a predetermined path of motion, the combination comprising:

a support;

a dog mounted on the support so as to be movable therealong between a first drive position to a second drive position, the dog being engageable with the work piece transfer member to move it along a portion of the distance between said first drive position and said second drive position;

rotary drive means; and

means for drivingly connecting said rotary drive means with said dog, said connecting means further comprising:

a cam member having a cam slot formed therein; said cam slot having a lineal section and an angled section,

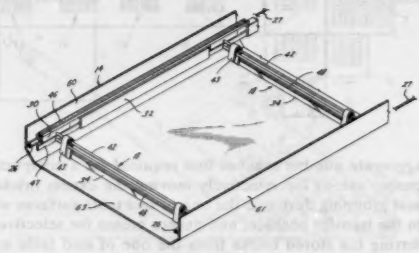
a driving member attached to said rotary drive means and received in said cam slot, whereby as the rotary drive means is rotated at a uniform rate of motion, the dog is accelerated as the driving member moves along the lineal section of the cam slot and then decelerated as the driving member moves along the angled section of the cam slot before it engages the work piece transfer member to move it along said predetermined path of motion.

4,018,329

ABRASIVE RECOVERY SYSTEM

James Dean Jarvis, Houston, Tex., assignor to Safety Steel Service, Inc., Victoria, Tex.

Filed Feb. 13, 1976, Ser. No. 657,737
Int. Cl.² B65G *25/08*
U.S. Cl. 198—743 **7 Claims**



1. Apparatus for sweeping particulate matter across a floor comprising

a pair of horizontal parallel, spaced-apart, support members,

a rail mounted on each support member, spaced upwardly from the lower edge of the support member and extending longitudinally thereof,

first and second frames longitudinally movably supported on said rails, each frame including a plurality of rods spanning the space between said rails, said frames having interspaced rail engaging portions allowing relative longitudinal movement of said frames along said rails,

a transverse, horizontally extending sweeping blade removably hanging upon, and unattached to, each of the rods of the first frame, each said blade having a portion engageable by a rod of the second frame upon relative longitudinal movement of said frames, whereby upon continued relative longitudinal movement the blade is pivoted about the rod of the first frame,

drive means operably connected to one of said frames adapted to cause said one frame to move longitudinally of said rails, and

cooperable engagement means on said frames for engagement of said one frame with the other frame, upon longitudinal movement of the said one frame an amount greater than that necessary to pivot the blades, to cause longitudinal movement of said other frame.

4,018,330

MATCHBOOK WITH SAFETY PANEL

Mildred M. Jorwa, 71 Lincoln Ave., Fair Lawn, N.J. 07410

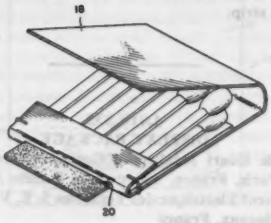
Filed Aug. 25, 1976, Ser. No. 717,546
Int. Cl.² A24F *27/00*
U.S. Cl. 206—106 **1 Claim**

1. A matchbook safety system, comprising:

a. a matchbook cover having a narrow transverse opening at or near the area of attachment of the matches to the cover; and

b. a separate safety panel being slidably inserted behind the matches and, further, having a tongue portion upon both sides of which are disposed friction strips, said tongue

adapted for press-fittable insertion into and retraction from said narrow transverse opening,



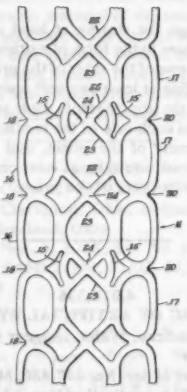
whereby ignition of a match cannot be effectuated except by manual extension of the safety panel.

4,018,331

MULTIPACKAGING DEVICES

Mindaugas Julius Klygis, Evergreen Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed May 29, 1975, Ser. No. 581,591
Int. Cl.² B65D *85/20*
U.S. Cl. 206—199 **17 Claims**



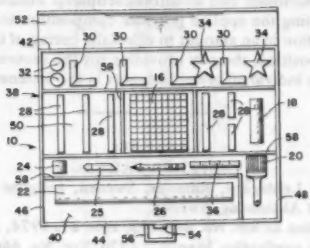
1. A multipackaging device for machine application to a plurality of containers to form multipackages of said containers, said multipackaging device comprising an elongated strip of resilient, elastic plastic flat sheet material, said strip comprising a first series of integral interconnected flat bands extending longitudinally of said strip along one side thereof, a second series of integral interconnected flat bands extending longitudinally of said strip along the other side thereof, said first and second series of bands being spaced-apart transversely of said strip and the bands of said first series of bands being in transverse alignment with the bands of said second series of bands, each of said bands having an inner peripheral dimension sufficiently less than the outer circumferential dimension of said containers to enable each of said bands to be capable of being stretched and circumferentially applied to one of said containers, a plurality of intersecting and substantially straight-line flat band segments integrally connected between said first and second series of bands longitudinally of said strip with the longitudinal axes of said band segments extending diagonally of the longitudinal axis of said strip to define intermediate bands within said strip and in substantially transverse alignment with transverse pairs of said first and second series of bands, and each of said intermediate bands having an inner peripheral dimension sufficiently less than the outer circumferential dimension of said containers to enable each of said intermediate bands in cooperation with said first and second series of bands to be capable of being stretched and and circumferentially applied to one of said containers upon application of a transverse stretching force to the transversely adjacent bands of said first and second series of bands, whereby a multipackage of containers may be produced upon transversely stretching said first and second series of bands and circumferentially applying the first and second series of bands simultaneously with said intermediate bands to said containers.

4,018,332

KIT FOR RENOVATING A PLANAR SURFACE

George Benda, Islington, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Aug. 21, 1975, Ser. No. 606,554
Int. Cl.² B65D *69/00*
U.S. Cl. 206—223 **5 Claims**



1. A kit for renovating a planar surface, which comprises:

a. a knife

b. a roll of plastic material having an adhesive backing and a wood patterned front face, a sheet of said plastic material cut from said roll with said knife, said sheet of said plastic material affixed onto said planar surface by means of said adhesive backing;

c. graph paper; said graph paper removably placed on said front face of said plastic material;

d. at least one pencil, said pencil outlining at least one pattern onto said front face of said plastic material around said graph paper said graph paper being cut by said knife into a plurality of shapes, said graph paper being removed from said front face of said plastic material after formation of said outline of said pattern;

e. a plurality of geometrically shaped members, each said member having an adhesive backing thereon, said geometrically shaped members being affixed onto said front face of said plastic material in a predetermined arrangement within said outlines of said patterns;

f. at least one paint brush;

g. a quantity of paint, said paint applied onto to said geometrically shaped members with said paint brush; and

h. a quantity of finish, said finish applied onto said paint coated on said geometrically shaped members with said paint brush.

4,018,333

METAL FASTENER STICKS AND PROCESS OF PREPARING SAME BY CURING POLYMERIC BINDER FOR SAID UNDER CONDITIONS OF U.V. IRRADIATION

John C. Blackwood, Melrose, Mass., assignor to Stepan Chemical Company, Northfield, Ill.

Continuation of Ser. No. 579,948, May 22, 1975, abandoned. This application Sept. 9, 1976, Ser. No. 721,705

Int. Cl.² B05D *3/06*; B21G *7/02*; B65D *85/54*; F16B *15/08*

U.S. Cl. 206—343 28 Claims

1. A metal-fastener assembly which comprises a plurality of individual metal fasteners in a closely aligned relationship, the individual fasteners secured together by an adhesive amount of an ultraviolet-radiation, cross-linked polymer, the polymer, prior to irradiation, comprising a polymer composition of an acrylated unsaturated polymer, a multifunctional acrylate monomer and an ultraviolet-photo initiator.

7. A metal staple stick which comprises a plurality of generally inverted, U-shaped, individual, metal staples in a closely aligned relationship in stick form, with a small groove between individual staples, the staples secured together by a thin adhesive amount of a small fillet of an ultraviolet-radiation, cross-linked polymer in the grooves on the exterior top of the metal staples, the polymer, prior to irradiation, comprising a cross-linked, acrylated, unsaturated polymer, a multifunctional acrylate monomer and an ultraviolet-photo initiator.

11. A process of manufacturing a metal-fastener assembly, which assembly comprises a plurality of individual metal fasteners in a closely aligned relationship, which process comprises:

a. applying a coating of an adhesive amount of an ultraviolet-radiation-curing polymer composition onto the metal-fastener assembly, the polymer composition comprising an acrylated unsaturated polymer, a multifunctional acrylate monomer and an ultraviolet-photo initiator; and

b. exposing the applied polymer composition to ultraviolet radiation in an amount to effect the curing of the polymer composition, thereby providing for the securing together of the individual metal fasteners in the fastener assembly.

4,018,334

FASTENER PACKAGE

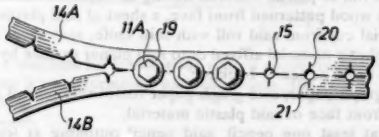
Sixten H. Lejdegård, Ramnas, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden

Continuation of Ser. No. 446,413, Feb. 27, 1974, abandoned. This application Mar. 12, 1976, Ser. No. 666,200

Claims priority, application Sweden, Mar. 9, 1973, 7303332

Int. Cl.² B65D *85/24*, *73/00*, *83/02*

U.S. Cl. 206—346 7 Claims



1. A strip of screws for use in a screw applying device, comprising:

a. A nonmetallic flexible carrier tape adapted to be coiled and having a series of holes therein disposed at equal intervals, there being a pair of radial longitudinal slits and a pair of radial transverse slits extending from each hole and defining lips between adjacent slits, said longitudinal slits extending longitudinally into proximity with the longitudinal slits of adjacent holes;

b. a series of metal screws disposed in said holes and each screw having a head disposed against said tape, the shank of each screw having a diameter greater than the diameter of the hole; and

c. said lips being displaced out of the plane of said tape with the distal end of at least one said lip at each hole disposed between adjacent turns of the screwthread in axial locking relationship;

whereby the portion of said strip lying between said adjacent longitudinal slits is fractured as the screw head is driven through the strip.

4,018,335

DISPLAY PACKAGE

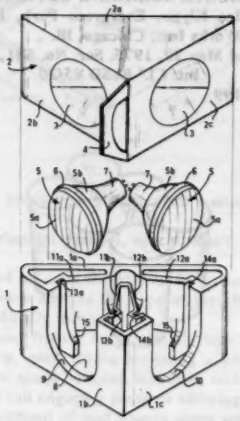
Pascal Marie Henri Jacob, and Gerard Pierre Guichesseux, both of Paris, France, assignors to Societe Anonyme pour l'Equipement Electrique des Venicules S. E. V. Marchal, Issy Les Moulineaux, France

Filed June 21, 1976, Ser. No. 698,024

Claims priority, application France, June 26, 1975, 75.20101

Int. Cl.² B65D *85/42*

U.S. Cl. 206—422 20 Claims



1. Display package for storing at least one fragile article comprising a container in the form of a prism having a polygonal bottom, at least one of the sides of the prism being partially hollowed out to define at least one seat open to the outside of the prism through the top thereof, each seat formed in the container having, on each side of the median plane of the seat parallel to the corners of the prism, and behind the outer surface of said at least one side, at least one groove substantially parallel to the corners of the prism.

4,018,336

PACKAGING OF ARTIFICIAL EYELASHES

Eric V. Aylott, Cwmbran, Wales, assignor to Eylure Limited, Cwmbran, Wales

Continuation-in-part of Ser. No. 447,436, March 1, 1974, Pat. No. 3,935,872. This application Nov. 13, 1975, Ser. No. 631,557

Claims priority, application United Kingdom, Aug. 3, 1973, 36971/73; Sept. 26, 1973, 45100/73

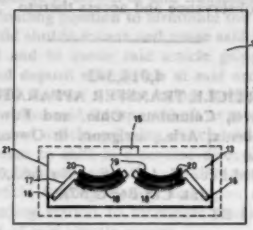
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.

Int. Cl.² B65D *73/00*, *85/54*; A45D *40/26*

U.S. Cl. 206—460 4 Claims

1. An eyelash presentation pack comprising a pair of eyelash sets each having a plurality of lashes held together by a base strand and said lashes being convex in side view and a supporting surface on which said eyelash sets are releasably

adhesively mounted, each said eyelash set being mounted with said convex side in cntact with said supporting surface with



said base strand of said eyelash set positioned away from the supporting surface.

4,018,337

HEAT SHRINK PACKAGING

Karl F. Barnett, Bloomfield Hills, Mich., assignor to Cadillac Products, Inc., Sterling Heights, Mich.

Continuation of Ser. No. 408,309, Oct. 23, 1973, abandoned. This application Jan. 13, 1975, Ser. No. 540,697

Int. Cl.² B65D *65/00*

U.S. Cl. 206—484 **15 Claims**

1. A packaged load having an exposed surface thereon formed of a given material, an outer layer of film surrounding said load at least in part and being heat shrunk into relatively intimate engagement therewith said outer layer being formed from a heat-shrinkable material of the same general composition as said given material, and a barrier layer of film material disposed between said exposed surface and said outer layer, said barrier layer being formed from a heat-shrinkable material which will not fuse to said given material when in contact therewith and subjected to film-shrinking temperatures.

4,018,338

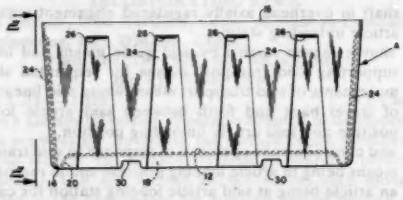
BOX AND LID THEREFOR

Jack L. Lemkin, Cincinnati, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,391

Int. Cl.² B65D *21/04, 21/02, 55/00, 43/00*

U.S. Cl. 206—505 **5 Claims**



1. A package comprising; a molded box and lid of substantially rigid synthetic plastic material, said box and lid having opposing draft angles, said molded box being nestable with like boxes and including an upwardly extending outwardly inclined box peripheral wall having an upper box peripheral edge substantially coplanar with said box peripheral wall, said molded lid being nestable with like lids and having a downwardly and outwardly extending lid peripheral wall, said lid being positionable on said box with said lid peripheral wall overlapping said upper box peripheral edge outwardly thereof so that the inner surface of said lid peripheral wall and the outer upper surface of said box peripheral wall adjacent said upper box peripheral edge directly face one another in nonparallel relationship at opposed draft angles to define a gap therebetween which increases in width in a direction from said upper box peripheral edge toward the bottom of said box, at least portions of said lid peripheral wall being hinged to define flaps for inward bending movement into close hugging relationship with only the outer upper surface of said box peripheral wall to substantially close said gap when said lid and box are strapped together, said flaps being hinged along molded hinges defined by reduced thickness portions of said lid, said flaps having outer edges of a length slightly less than the length of said flaps along said hinges, and said hinges being molded to normally bias said flaps outwardly of said lid at small angles to the vertical.

4,018,339

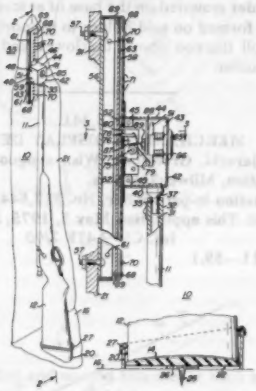
ANTI-THEFT GUN PROTECTOR APPARATUS

Peter G. Pritz, c/o Trico non Ferrows Metal Products Inc., Wyandotte Road, Willow Grove, Pa. 19090

Continuation-in-part of Ser. No. 635,642, Nov. 26, 1975, abandoned. This application June 11, 1976, Ser. No. 695,260

Int. Cl.² F05B *73/00;* **A47F** *7/00*

U.S. Cl. 211—8 **8 Claims**



1. Anti-theft gun protector apparatus for use with a rifle or shotgun having a barrel and a fixed stock which comprises

fixedly mounted cup means horizontally disposed to receive said gun stock,

fixedly mounted vertically disposed mounting means comprising a vertical portion having a vertical face and vertical flanges and a mounting plate member secured to said vertical portion and having a front face,

said front face having a plurality of vertically disposed spaced openings,

locking box means vertically slidably carried with respect to said mounting plate member,

said box means including a guide plate member movable along said mounting plate member,

pin means carried by said box means to engage the barrel of the gun,

resiliently urged latch means carried in said box means and having an end portion for selective engagement in one of said vertically spaced openings, and

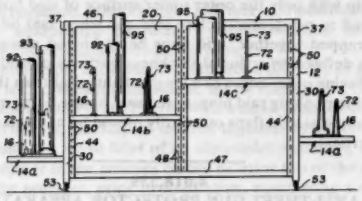
lock means carried by said box means to control the positioning of said latch means in holding or retracted position.

4,018,340

ADJUSTABLE DISPLAY UNIT

Joseph Gold, 202-456 W. Broadway, Vancouver, British Columbia, Canada (V5Y 1R3)

Filed Nov. 10, 1975, Ser. No. 630,453
Claims priority, application Canada, Jan. 14, 1975, 217896
Int. Cl.² A47F 7/18
U.S. Cl. 211—44 10 Claims



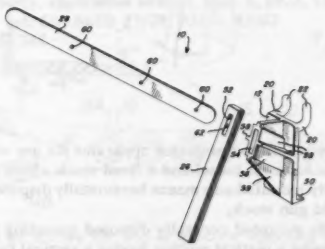
1. A display unit for wound rolls of fabric, comprising a support structure, a shelf mounted on said structure, and a plurality of holder units carried by the shelf, each holder unit comprising a base, an elongated holder mounted on and projecting upwardly from the base, said holder being of such dimensions as to fit within a fabric roll and being long enough to support the roll on end in a substantially vertical position, a second holder mounted on the base of at least one holder unit, and a stop formed on said holder to support the lower end of a fabric roll thereon above the lower end of a roll on the adjacent holder.

4,018,341

MERCHANDISE DISPLAY DEVICE

James J. Jarecki, Greendale, Wis., assignor to E Z Painter Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 512,544, Oct. 7, 1974, abandoned. This application May 5, 1975, Ser. No. 574,705
Int. Cl.² A47F 7/00
U.S. Cl. 211—59.1 13 Claims



1. A hanger for securement to a support panel, or the like, for displaying a plurality of articles, said display hanger comprising:

a base including attachment means to secure the base to the support panel;

a generally upwardly canted, elongated hanging arm member secured to the base and protruding outwardly from the support panel for receiving a plurality of articles in stacked relationship therealong; and

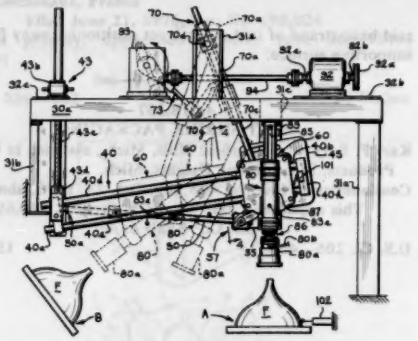
a generally downwardly canted positioning arm member movably mounted to the hanging arm member whereby the bottommost of said stacked plurality of articles on said hanging arm is supported in a generally upwardly canted position relative to the support panel with the remainder of the stacked articles so positioned seriatim to facilitate observance and access thereto.

4,018,342

ARTICLE TRANSFER APPARATUS

Mario Cuniberti, Columbus, Ohio, and Edwin C. Pinsenschaum, Phoenix, Ariz., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 27, 1976, Ser. No. 662,054
Int. Cl.² B65G 57/20
U.S. Cl. 214—1 BT 30 Claims



1. Transfer apparatus for transferring an article from an article loading station at which an article is oriented in one position and depositing the article in a removed article unloading station, said transfer apparatus comprising:

a. transport means having an elongated axially extendable and retractable transport shaft with an article gripping chuck at one axial end for releasably gripping an article at said article loading station and releasing said article at said article unloading station, said transport means also including orientational referencing means providing a horizontally disposed reference axis serving to precisely correlate the orientational positioning of said transport means relative to both said article loading station and said article unloading station;

b. guide means arranged overhead of and stretching between said article loading and article unloading stations for carrying and guiding said transport means along a linear path of travel between interspaced loading and unloading positions located in a common vertical plane intersecting said article loading and article unloading stations, said article loading position being a position for said transport means reference axis correlated to dispose said transport shaft in overhead axially registered alingment with said article loading station, and said article unloading position being a position for said transport means reference axis correlated to dispose said transport shaft in overhead axially registered alignment with said article unloading station,

c. shuttle means carried by said guide means and in turn supporting said transport means for sequential shuttle movements of said transport means along said linear path of travel back and forth between said article loading position and said article unloading position,

d. and control means operative in response to said transport means being in article loading position and in response to an article being at said article loading station for causing said transport shaft to extend and bring said article gripping means into registered article gripping engagement with an article at said article loading station and to thereafter retract said transport shaft with said article chuck carrying said article and shift said shuttle means with said

transport means along said linear path of travel from said article loading position to said article unloading position and in response to arrival of said transport means at said article unloading position to terminate the shifting movement of said shuttle means and cause said transport shaft to extend and to cause said article gripping chuck to release and deposit said article at said article unloading station, said control means being further operable to thereafter cause said transport shaft to retract said transport shaft and article gripping chuck and to cause said shuttle means to shift in a reverse direction and return with said transport means along said linear path of travel to said article loading station and upon arrival at said article loading station to terminate the shifting return movement of said shuttle means.

4,018,343

REMOTE-CONTROLLED, MOTOR-PROPELLED TRANSPORT CAR FOR THE TRANSPORT OF MOTORS DURING ASSEMBLY AND TESTING, AND A TEST STATION FOR USE TOGETHER WITH THE TRANSPORT CAR

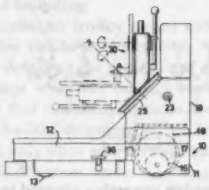
Per-Gunnar Arthur Perhed, Skovde, Sweden, assignor to AB Volvo, Goteborg, Sweden

Filed July 7, 1975, Ser. No. 593,455

Claims priority, application Sweden, July 11, 1974, 7409137

Int. Cl.² B23Q 7/00

U.S. Cl. 214—1 Q **10 Claims**



1. A transport car for transporting motor parts or a complete motor along a path to sequential working stations including a testing station and for supporting said motor parts or motor during various work operations including testing, said transport car comprising a base frame having at least three wheels, at least one of which is steerable and at least one of which is driven, and a fixture mounted on said base frame for carrying said motor parts or motor, said fixture comprising means for selectively connecting said motor to said car in either a rigid, assembly-facilitating condition or a resilient, testing-facilitating condition.

4,018,344

THREE-POSITION ACTUATOR AND APPARATUS INCORPORATING SAME

Adam Leshem, West Hartford, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Nov. 18, 1975, Ser. No. 633,063

Int. Cl.² F28G 15/08

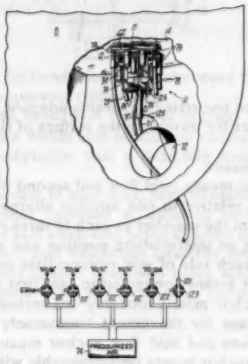
U.S. Cl. 214—1 BB **12 Claims**

1. In a surface traversing apparatus adapted to be supported near a member for traversing the surface of the member by stepwise motion, the surface traversing apparatus including base means, first and second anchor means each movably conected to the base means for stepwise lateral relative motion in different respective directions, the first and second anchor means being selectively engageable with the member for resisting lateral motion relative thereto, first and second actuating means operatively connected to the first and second anchor means respectively and to the base means for moving the respective first and second anchor means laterally relative to one another in discrete steps, means to alternately engage the first and second anchor means with the member while the other of the anchor means is disengaged from the member so as to transport the first or second anchor means laterally relative to the other of the anchor means by the first or second actuating means respectively to move the first and second anchor means to new relative positions, the improvement wherein said first and second actuating means respectively each comprises:

a fluid cylinder fixed to said base means, said cylinder having a pair of fluid ports positioned toward respectively opposite ends thereof;

piston means in said cylinder, said piston means having piston rod means affixed thereto and connected to a respective one of said first and second anchor means, said piston means being selectively reciprocably movable axially in either direction from a substantially constant neutral position in said cylinder;

first and second axially compressible mechanical bias means within said cylinder on axially opposite sides of the piston



means, said first and second bias means each including a respective axially inner end for compressive engagement with a respective opposite side of the piston means whenever the piston means is axially displaced from said neutral position in the direction of the respective bias means for applying an axially inward biasing force to the piston; and

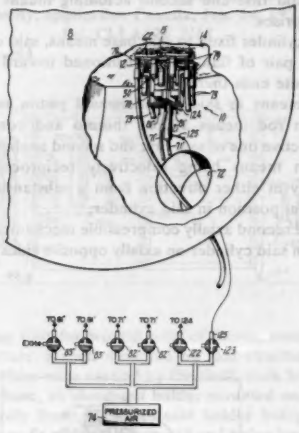
first and second limit means in said cylinder for limiting the axially inward travel of the axially inner end of said first and second bias means respectively such that a net axial biasing force is always applied to said piston means by one or the other of said first and second bias means except at said neutral position of said piston, whereby fluid pressure selectively applied alternatively through one or the other of the cylinder fluid ports to the respective side of the piston means is operative to overcome the respective said first or second bias means and displace said piston means oppositely from said neutral positioning by a step increment and release of fluid pressure from both sides of said piston means allows the respective first or second bias means to return said piston means to said neutral position.

4,018,345

SURFACE TRAVERSING APPARATUS

Frank Joseph Formanek, West Suffield, and Adam Leshem, West Hartford, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Nov. 18, 1975, Ser. No. 633,064
Int. Cl.² F28G 15/08
U.S. Cl. 214—1 BB 14 Claims



1. A surface traversing apparatus adapted to be supported near a member for traversing the surface of the member comprising:

first base means;

second base means, said first and second base means being movable relative to one another alternately toward and away from the member to each of three relative positions including an intermediate position and an extreme position on each side of said intermediate position;

first anchor means connected to said first base means;

second anchor means movably connected to said second base means for movement transversely of said second base means and said first anchor means, said first and second anchor means being movable with the respective said first and second base means alternately to and away from the member for respective engagement with and disengagement from the member for respectively restricting and permitting relative lateral motion between the member and the respective said anchor means, both said first and second anchor means being positioned for said engagement with the member at said intermediate one of said three relative positions of said first and second base means and only an opposite one of said first and second anchor means being positioned for said engagement with the member at each opposite one of said two extremes of said three relative positions of said first and second base means;

drive means operatively connected to said second base means and said second anchor means for selectively moving said second anchor means transversely of said second base means and said first anchor means; and

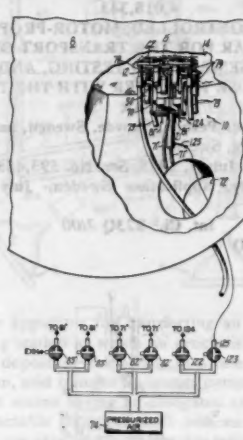
actuator means connected to said first and said second base means for selectively moving said first and said second base means alternatively to each of said three relative positions to engage both said first and said second anchor means with the member at said intermediate one of said three relative positions and to disengage an alternate one of said first and second anchor means at either of said two extreme relative positions of said first and second base means while the other said anchor means remains engaged with the member so as to transport said second anchor means by said drive means transversely relative to said second base means and first anchor means thereby to move said first and second anchor means to new relative lateral positions.

4,018,346

MOUNTING ARRANGEMENT FOR ANCHOR FINGERS ON A SURFACE TRAVERSING APPARATUS

Adam Leshem, West Hartford; Martin Lewis Marugg, Enfield, both of Conn., and Dennis Edward Savor, Chattanooga, Tenn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Nov. 18, 1975, Ser. No. 633,065
Int. Cl.² F28G 15/08
U.S. Cl. 214—1 BB 13 Claims

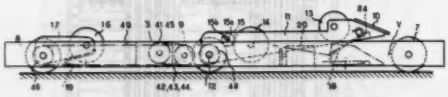


1. In a surface traversing apparatus adapted to be supported near a member, the member having an ordered array of laterally spaced openings extending longitudinally thereinto from its surface, the surface traversing apparatus including base means, first and second finger means each sized for relatively close fitting insertion into the member openings, means connecting the respective first and second finger means to the base means to extend longitudinally toward the member, the first and second finger means each being mounted for longitudinal reciprocation toward and away from the member for insertion into and withdrawal from the openings therein respectively, the insertion of a finger means into an opening in the member serving to restrict relative lateral motion therebetween, said first finger means being movable transversely of the base means and said second finger means, drive means operatively connected to the base means and to the first finger means to move the first finger means transversely of the base means and the second finger means from one member opening into near alignment with another member opening, means for selectively alternately inserting the first or second finger means while the other of said finger means is withdrawn so as to transport the first finger means transversely of the base means and the second finger means by said drive means to move the first and second finger means to new relative positions, the improvement wherein the means for connecting the first and second finger means to the base means comprise means interposed in operative engagement between the base means and at least one of the first and second finger means for flexibly mounting said at least one of the first and second finger means for limited lateral deflection relative to the other of the finger means by engagement with a sidewall member of a said member opening thereby to facilitate insertion of said first and second finger means into respective openings in the member.

4,018,347
DISPLAY CABINET

Georges Coppel, Paris, France, assignor to Construction Mills-K, France

Continuation-in-part of Ser. No. 411,334, Oct. 31, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,549
Int. Cl.² B65G 47/00
U.S. Cl. 214—16 B 8 Claims



1. A package transfer system, for automatically transferring packages along a horizontal lane from a first entrance extremity of the lane to a second exit extremity of the lane, comprising:

i. a lane including electrical supply rails, two laterally-spaced upper horizontal runways to receive packages loaded thereon, and a central lower runway between said upper runways,

ii. an automotive removable carriage placed on said lower runway and including

a. current collector trolley means slidable on said rails,

b. retractible mechanical detecting means on said carriage for detecting the presence of a package in front of the carriage when the carriage moves in the direction from the first extremity towards the second extremity, said mechanical detecting means being arranged to be retracted only when said carriage has partially engaged, in the said direction, under a package encountered, and being arranged to be restored again when, with the carriage having continued to move under said package until eventually wholly supporting said package, the said detecting means do not detect a further package immediately following said encountered package, and

c. further mechanical means and raising means on said carriage to cooperate in raising said encountered package and moving it along with the carriage and depositing it on said upper runway when the said mechanical detecting means detect the presence of a further package adjacent to which the said encountered package is deposited.

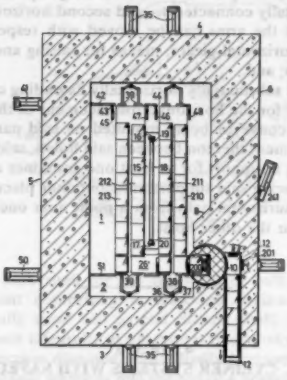
d. said mechanical detecting means comprises an assembly angularly movable about a pivot axis into upper and lower limiting positions, said assembly including a feeler roller, a spring urging said feeler roller to a raised position, said spring being selected to be of such strength that it cannot alone raise a package the weight of which is greater than a predetermined value,

e. said further mechanical means include a first lifting roller carried on said assembly, the distance of the axis of the first lifting roller from the pivot axis being less than the distance of the axis of the feeler roller to the pivot axis, a second lifting roller disposed at the rearward extremity of the carriage, a second spring urging said second lifting roller to a raised position, said second spring being selected to be of such strength that it cannot alone raise a package the weight of which is greater than said predetermined value, said first and second springs being together capable of lifting a package resting on said first and second lifting rollers and of a weight greater than said predetermined weight

4,018,348
APPARATUS FOR IRRADIATING GOODS CONVEYED IN RECEPTACLES

Ernst Bosshard, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 28, 1975, Ser. No. 608,759
Claims priority, application Switzerland, Sept. 2, 1974, 11877/74
Int. Cl.² B65G 65/30
U.S. Cl. 214—17 B 8 Claims



1. An apparatus for irradiating goods conveyed in a series of receptacles, said apparatus comprising

a wall defining an irradiation chamber in part;

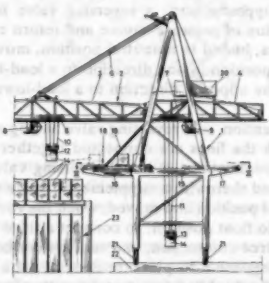
a conveyor system within said irradiation chamber for conveying the receptacles past a radiation source in said chamber; and

a turntable mounted in said wall, said turntable having a pair of chambers disposed at different vertical levels therein, one of said chambers being adapted to introduce a receptacle into said irradiation chamber and the other of said vertically spaced chambers being adapted to remove a receptacle from said irradiation chamber.

4,018,349
TRANSHIPMENT INSTALLATION, PARTICULARLY FOR CONTAINERS

Leonard Hupkes, Heemstede, Netherlands, assignor to Conrad-Stork B.V.

Filed Sept. 2, 1975, Ser. No. 609,359
Claims priority, application Netherlands, Sept. 6, 1974, 7411880
Int. Cl.² B63B 27/12
U.S. Cl. 214—87 5 Claims



1. A container loading and unloading device wherein containers are raised along a substantially vertical path, thereafter

displaced along a horizontal path and finally lowered along a vertical path, said device comprising:

a first horizontal girder supported by a frame at a predetermined elevation above a floor;

at least two hoists disposed for raising and lowering of the containers, said hoists being supported by and movable over said girder and operatively positioned a distance from each other;

a second horizontal girder supported by the frame beneath said first girder;

a set of horizontal parallel arms extending beyond the frame and pivotally connected to said second horizontal girder such that the arms can be moved with respect to said second horizontal girder, means for raising and lowering said arms; and

at least one substantially horizontally extending continuous conveyor for the horizontal displacement of the containers, said conveyor being mounted on said parallel arms for movement thereon between said hoists, said conveyor including a support for at least one container and means for displacing said support and container placed thereon along a horizontal path from a point near one hoist to a point near the other hoist.

4,018,350

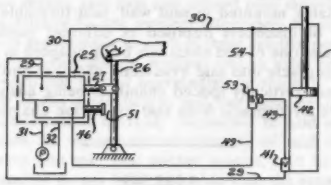
HYDRAULIC CYLINER SYSTEMS WITH SAFEGUARDED FLOAT ACTION

Wilburn Kelly Brown, Morton Grove, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Filed Mar. 17, 1975, Ser. No. 558,782

Int. Cl.² E02F *3/70*

U.S. Cl. 214—140 **7 Claims**



1. A hydraulic cylinder system with safeguarded float action, including:

as environment for the invention, double-acting load-lifting cylinder means having a lift port internally subject to pressure from the lifted load, and an opposite port; a pilot-actuated safety valve for the lift port integrated with the lift port, a lift-port line connected to the lift port through the safety valve, an opposite-port line connected to the opposite port, a reversing valve for controlling connection of pressure-source and return connections to said lines, biased to a neutral position, movable from the neutral position in one direction to a load-lifting position and in the opposite direction to a load-lowering position, and

by this invention, said reversing valve having a float position in which the lines are connected together and to a discharge connection; and said reversing valve unit having associated therewith a supplemental valve unit, biased to a neutral position and moved, when the reversing valve is moved to float position, to connect a third line to a pressure-source connection; and said system having a shuttle valve responsive to pressure in either the opposite-port line or the third line for connecting that line to the safety valve to provide a pilot pressure for releasing the safety valve so that hydraulic fluid can flow through the lift port to and from the lift-port line.

4,018,351

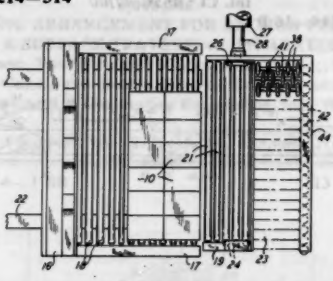
APPARATUS FOR HANDLING BUNDLES OF SHEETS

Walter John Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Filed Mar. 4, 1976, Ser. No. 663,825

Int. Cl.² B21C *47/24*

U.S. Cl. 214—314 **7 Claims**



1. An automatic depalletizer for removing bundles of sheets from a pallet disposed in a horizontal position, comprising a pivotal pallet holder having two legs disposed at a right angle to each other and with said holder being pivotally mounted about an axis at the juncture of said two legs, one of said two legs being horizontally disposed and arranged to support a pallet with bundles of sheets thereon in a prone position, the other of said two legs being uprightly disposed and arranged to abut the pallet and the bundles of sheets thereon, whereby pivoting said holder about said axis positions said other leg in a horizontal position with the bundles thereon in an upstanding position, a conveyor disposed adjacent said holder at the side thereof adjacent said other leg, anti-friction members extending along said other leg for movement of the bundles of sheets off said other leg in a conveying direction and toward said converor whereby all of the bundles resting on said pallet before pivoting of said holder move along said anti-friction members and away from said pallet after pivoting of said holder, said conveyor being arranged with a width to receive a row of the bundles of sheets when the row is moved onto said conveyor from said other leg in the said conveying direction which is in the direction transverse to the length of said row, a second conveyor disposed adjacent the first-mentioned conveyor and being movable in the direction parallel to said width of said first-mentioned conveyor and disposed in communication therewith for receiving the bundles of sheets therefrom one row separately at a time for moving the bundles in the direction of the length of the row thereof, and branch conveyors disposed at spaced locations along said second conveyor and extending oblique to said second conveyor and in bundle movement communication therewith and extending to various locations for the delivery of the bundles of sheets to those locations.

4,018,352

ANTI-ROLLBACK MECHANISM FOR MATERIAL HANDLING IMPLEMENT

Edgar K. Lindstrom, Wichita, Kans., assignor to J. I. Case Company, Racine, Wis.

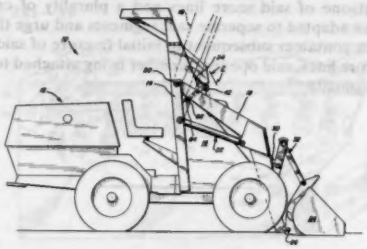
Filed July 31, 1975, Ser. No. 600,717

Int. Cl.² E02F *3/86*

U.S. Cl. 214—761 **6 Claims**

1. In an elongated vehicle having a lift arm pivotally supported at one end with means for raising and lowering said arm, a material handling unit pivotally supported on a free end of said lift arm with hydraulic means for pivoting said unit on said arm, said hydraulic means including a lever pivoted on a pivot axis in opposite directions from a neutral position to pivot said unit forward and rearward with respect to said vehicle; position defining means adjacent said lever defining the position of said arm on said vehicle, said position defining means including an abutment disposed in the pivotal path of

movement of said lever to prevent actuation of said lever in one direction when said arm is in a fully raised position with respect to said vehicle, said lever being laterally shiftable on



said pivot axis to accommodate relative movement between said lever and said abutment and allow pivotal movement of said lever in said one direction beyond said abutment.

4,018,353

VACUUM CLOSURE FOR CONTAINERS

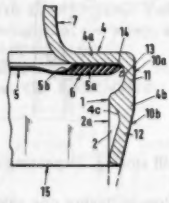
Heinz Marklein, Braunschweig, Germany, assignor to Fa. Schmalbach-Lubeca GmbH, Braunschweig, Germany

Filed May 7, 1975, Ser. No. 575,383

Claims priority, application Germany, May 11, 1974, 7416495[U]; Feb. 5, 1975, 2504803

Int. Cl.² B65D *41/48*

U.S. Cl. 215—253 12 Claims



1. Vacuum closure for containers consisting of a substantially flat and relatively rigid closure member having an axis and a cap-like outer fitment of relatively more flexible material, the closure member having means for forming a compression-seal disposed around the periphery thereof by which said closure member is adapted to sealingly engage the end face of the container; said outer fitment including a skirt portion having a smooth outer face adapted to extend downwards, lifting means attached directly to said skirt portion, said skirt portion having a lower edge and including inwardly directed bead means for engaging the outer face of the container when the closure is in closing position and engaging under the outer edge of said closure member when said fitment is lifted by means of the lifting means, wherein the inwardly directed bead means consist of a plurality of beads circumferentially spaced apart from each other each of which being T-shaped including a stem and cross portion when viewed in radial direction and arranged in such a manner that the stem of the said T-shaped bead extends substantially parallel to the axis of the closure member and towards the lower edge of said collar portion.

4,018,354

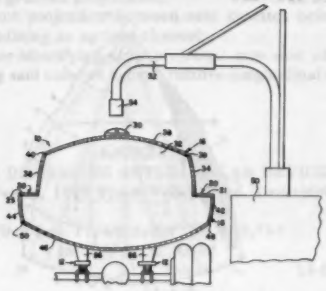
TANK SHELL WITH INTEGRAL WALKWAY

James H. Lawler, 5879 Paint Valley Drive, Rochester, Mich. 48063

Filed Oct. 31, 1975, Ser. No. 627,524

Int. Cl.² B65D *7/02, 7/34*

U.S. Cl. 220—20 13 Claims



1. In a tank shell for the transport of bulk material the improvement comprising at least one walkway extending longitudinally from end to end of said shell, said walkway being formed integrally in a lateral wall of said shell having a stepped portion disposed substantially horizontally defining the floor of said walkway and the top of a portion of said shell extending below said walkway.

4,018,355

INNER LID OF A RECEPTACLE FOR INSTANT-COOKING FOODS

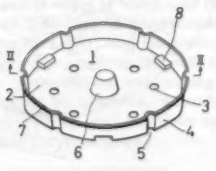
Koki Ando, Osaka, Japan, assignor to Nissin Shokuhin Kaisha, Ltd., Osaka, Japan

Filed Dec. 15, 1975, Ser. No. 641,039

Claims priority, application Japan, Dec. 13, 1974, 49-151556[U]; Apr. 19, 1975, 50-53589[U]; May 16, 1975, 50-66590[U]

Int. Cl.² B65D *1/34;* A47G *19/22*

U.S. Cl. 220—23 9 Claims



1. A lid for removably fitting within the inside walls of the top of a receptacle, said lid comprising:

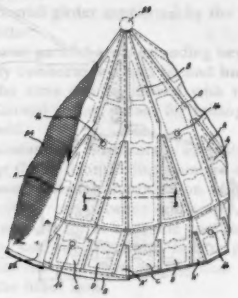
a bottom portion having a plurality of openings therethrough; and

a circumferential wall surrounding and extending upward from said bottom portion, said wall having a plurality of longitudinally grooved portions therein the height of said wall, whereby passageways are formed between said grooved portions and the interior of said receptacle when said lid is fitted within the inside walls of said receptacle.

4,018,356
FLOATING DECK FOR LIQUID STORAGE TANK

I. Emery Szasz, 7431 Kingsley Road, Montreal, Quebec, and Edmund B. Sandborn, 1001 rue de Kingston, No. 34, Boucherville, Quebec, both of Canada

Filed May 28, 1976, Ser. No. 690,836
Int. Cl.² B65D 87/20
U.S. Cl. 220—220 18 Claims



1. In a floating deck for use in a liquid storage tank, a generally circular planar platform formed of a plurality of interconnected modular units made of cellular foam plastic, said modular units being of different shape and including at least:

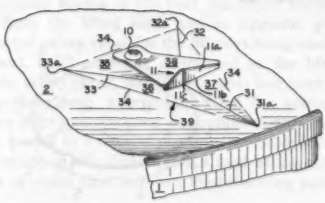
a first series of panels, each being in the form of a truncated triangle;

a second series of panels, each having a shape including at least a parallelogram portion and a small triangular-shaped portion outwardly projecting from one side of said parallelogram portion at the upper end thereof; said small triangular-shaped portion having a dimension corresponding to the truncated portion of said truncated triangle of said first series of panels so as to form a continuous platform when said first and second series of panels are interconnected to one another.

4,018,357
POUR OPENING FOR LIQUID CONTAINERS

Obert M. Ostrem, Westmont, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,621
Int. Cl.² B65D 41/32
U.S. Cl. 220—268 4 Claims

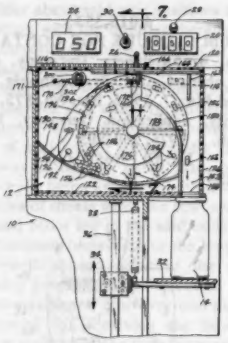


1. An improved easy-opening end closure for a can or similar container, comprising an end panel and an opening member, said end panel having a plurality of substantially straight, interconnected score lines formed therein, the distal ends of said score lines defining the apices of a substantially rectilinear openable member comprising a plurality of substantially rectilinear segments each having at least two sides thereof defined by said score lines and a side comprising an integral hinge nonremovably attaching said segments to the remaining portion of said end panel, means non-removably attaching said opening member proximate one end thereof to said end panel, said opening member being adapted to effect opening of said openable member pursuant to a panelwardly directed application of digital pressure on the opening member distal end, said opening member distal end including force concentration means for focusing an initial opening force proximate at least one of said score lines and a plurality of camming surfaces adapted to separate said segments and urge the same into the container subsequent to initial fracture of said one of said score lines, said opening member being attached to one of said segments.

4,018,358
CASSETTE PILL STORING, DISPENSING AND COUNTING MACHINE

Robert D. Johnson; John W. Havener; Franklin W. Reyner, Jr.; Loren K. Whitver; Norman W. Kilburn, all of West Union, and Jack M. Hoglan, Independence, all of Iowa, assignors to Pharmaceutical Innovators, Ltd., West Union, Iowa

Filed Sept. 18, 1975, Ser. No. 607,782
Int. Cl.² B65B 57/20
U.S. Cl. 221—7 26 Claims



1. A cassette pill storing, dispensing and counting machine comprising:

a machine enclosure having one side wall on which a cassette for storing and dispensing pills is positioned, said one side wall having a vacuum source and a wheel driving means, said cassette including a pair of side walls, a pair of end walls and top and bottom walls defining a storage chamber,

a rotatable pill conveying wheel engaging said wheel driving means positioned in one of said side walls and including a plurality of openings providing communication between said chamber and the outside vacuum source annularly arranged around the wheel's axis of rotation for holding pills on said wheel under a vacuum from said vacuum source,

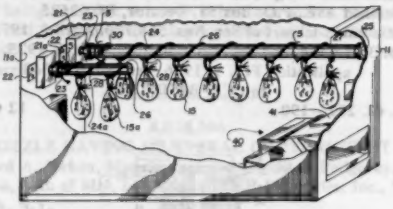
a discharge opening in communication with said chamber, and

a pill separator means positioned to operatively separate said pills from said wheel such that said pills are discharged through said discharge opening upon said wheel having conveyed said pills to said separator means, said wheel driving means having an annular rotating wall having an outer edge engaging said pill conveying wheel and being held in engagement by said vacuum applied to said wheel by said vacuum source.

4,018,359
LIVE BAIT VENDING APPARATUS

James T. Lambert, Rte. 1, Princeton, Tex. 75077

Filed June 6, 1975, Ser. No. 584,282
Int. Cl.² G07F 11/36
U.S. Cl. 221—14 5 Claims

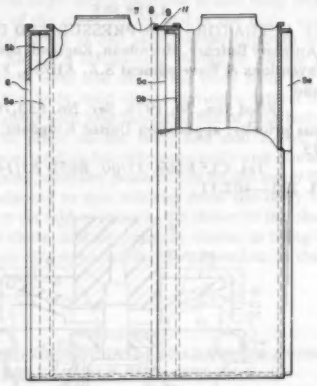


1. Article vending apparatus, comprising:
a. a rotatably mounted support shaft adapted to support, along its length, articles to be dispensed,
b. conveyer means associated with said support shaft for advancing said articles in the longitudinal direction of said support shaft as said support shaft is rotated,
c. drive means, when actuated, rotating said support shaft, thereby to advance said articles in said longitudinal direction, and
d. means for preventing actuation of said drive means and responsive to the number of articles supported by said support shaft, said deactuator means comprising:
i. spring biased platform means supporting said support shaft and providing a force for urging said support sahft in an upward direction, the extent of the resulting upward movement of said shaft being dependent upon the total weight of articles supported by such shaft, and
ii. switch means operable by said support shaft when the said upward movement of said shaft reaches a predetermined extent, the switch means, when operable, preventing actuation of said drive means.

4,018,360
CASSETTE FOR DISPENSING YARN REELS

Friedrich Strauss, Bonnigheim, Germany, assignor to Amann & Söhne, Bonnigheim, Germany

Filed Jan. 5, 1976, Ser. No. 645,010
Int. Cl.² B65H 49/18
U.S. Cl. 221—310 1 Claim

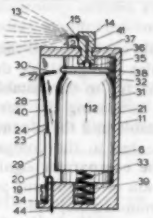


1. In combination, at least a pair of quadriform casettes for dispensing yarn reels, said casettes being assembled side-by-side, each casette including front and side walls and a series of vertically spaced laterally elongated channels open at their front walls for dispensing, one at a time, a series of parallel yarn reels stored within each channel;
reel stop means at the front of each channel;
the opposed side walls of each casette having a respective resilient tongue and groove formation, with the tongue on one side wall of one casette resiliently nested within the corresponding groove on the side wall of an adjacent casette laterally interconnecting said casettes;
each casette having along its front wall at its side outwardly directed grooved projections;
the adjacent projection between said casettes being opposed defining an upright channel;
and a color-identifying strip projected into said channel retaining said casettes against relative longitudinal movement.

4,018,361
FLUID DISPENSING ANTI-BURGLAR DEVICE

Charles R. Fegley, 1606 Frush Valley Road, Laureldale, Pa. 19605

Filed Feb. 17, 1976, Ser. No. 658,714
Int. Cl.² F17C 13/08
U.S. Cl. 222—5 14 Claims



1. A fluid dispensing anti-burglar device for use with a pressurized container, the device comprising:
a. a body member;
b. means for supporting said pressurized container in said body member, wherein said pressurized container has a fluid-dispensing element adapted to release fluid under pressure from said pressurized container when actuated;
c. dispensing element actuating means mounted in said body member and adapted to engage and actuate said fluid-dispensing element;
d. a passageway in said dispensing element actuating means having an entry section at one end thereof;
e. spring means biased to force said fluid-dispensing element and said dispensing element actuating means into engagement with each other, thereby causing said fluid-dispensing element to be actuated;
f. an electrothermal actuator releasably retaining said spring means in a cocked position in which said fluid-dispensing element and said dispensing element actuating means are separated from each other, said electrothermal actuator releasing said spring means from its cocked position upon the application of electric current causing said fluid-dispensing element to be actuated, whereby fluid under pressure is released from said container to pass through said entry section and passageway.

4,018,362
AUTOMATIC CONTROL FOR LIQUID FLOW

Patrick Ubaud, Villeurbanne, France, assignor to Union Chimique Continentale-U.C.C., Puteaux, France

Filed Nov. 6, 1975, Ser. No. 629,239
Int. Cl.² B67D 5/08
U.S. Cl. 222—55 2 Claims

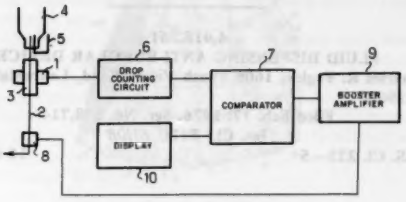
1. A system for automatically regulating liquid flow comprising:
a piston;
a counter-plate;

a flexible tube for conveying a liquid, the tube being positioned between the piston and the counter-plate;

a photoelectric pick-up connected to the tube for detecting the passage of drops of the liquid therethrough;

a first monostable connected to and operated by the photoelectronic pick-up for counting the drops of the liquid passing through the tube;

a bistable connected to the first monostable and responsive to the counting of the first monostable for supplying an output pulse of duration equal to the time interval between the passage of consecutive drops of the liquid through the tube;



a second monostable connected to the bistable for supplying an output pulse of regulatable duration;

a comparator connected to the bistable and to the second monostable for comparing the duration of the output pulses of the bistable and the second monostable;

an amplifier connected to the comparator and activated thereby when the comparator signifies a mismatch between the duration of the output pulses of the bistable and the second monostable; and

a bi-directional motor connected to the amplifier and activated thereby for moving the piston to squeeze the tube against the counter-plate to regulate the flow of drops of liquid passing through the tube.

4,018,363

SOAP DISPENSER

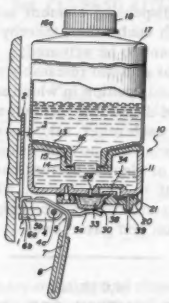
Antonio Macchi Cassia, La Milan, Italy, assignor to Steiner American Corporation, Salt Lake City, Utah

Filed Oct. 6, 1975, Ser. No. 620,179

Claims priority, application Italy, Oct. 7, 1974, 28157/74

Int. Cl.² B67D *5/06*

U.S. Cl. 222—80 **10 Claims**



1. A dispenser for liquid soap comprising a support bracket attachable to a wall, actuating means attached to said support bracket, emitting means removably mountable on said support bracket independently of said actuating means and having a fluid outlet, a liquid soap container removably attachable to said emitting means and communicating with said fluid outlet, and pumping means carried by said emitting means for emitting charges of liquid soap from said fluid outlet, said actuating means being disposed for contact with said pumping means for effecting operation thereof.

4,018,364

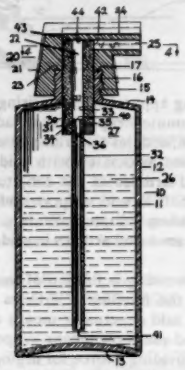
FOAM DISPENSING DEVICE

Hershel Earl Wright, c/o Creative Products, Inc., 2670 E. Garfield Ave., P.O. Box 51, Decatur, Ill. 62525

Continuation-in-part of Ser. Nos. 564,700, April 3, 1975, Pat. No. 3,937,364, and Ser. No. 564,701, April 3, 1975. This application Feb. 9, 1976, Ser. No. 656,347

Int. Cl.² B65D *83/14*

U.S. Cl. 222—190 **12 Claims**



1. A foam dispensing device comprising:

a. a flexible container for holding a foamable liquid and air having a discharge port,

b. a porous member, of rigid porous material, separating the area adjacent said discharge port and the interior of the container and having a passage extending at least partly through the porous member,

c. conduit means including an opening communicating with the porous member by way of said passage, said conduit means extending into the interior of said container and including another opening communicating with the interior of said container.

4,018,365

VALVE ACTUATORS FOR PRESSURIZED DISPENSERS

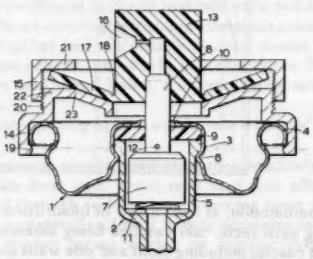
Roger Anthony Butcher, Horndean, England, assignor to Aerosol Inventions & Development S.A. AIDSA, Fribourg, Switzerland

Filed Jan. 30, 1976, Ser. No. 653,706

Claims priority, application United Kingdom, Feb. 4, 1975, 4644/75

Int. Cl.² F16K *35/00*; B65D *83/14*

U.S. Cl. 222—402.11 **6 Claims**



1. An actuator assembly for the outlet device of a hand-held

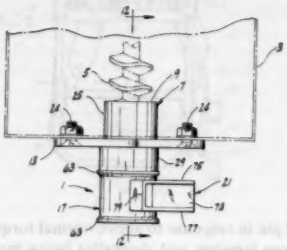
dispenser of the kind having a depressible operating stem, comprising an actuator member mountable on the stem, whereby the device can be operated by depression of said member, a stationary component mountable on the dispenser, a collar in screw-threaded engagement with said stationary component and surrounding said actuator means, and means interconnecting said collar and said actuator member, said collar being rotatable to move it between a first position at which said means prevents depression of said actuator member and to a second position in which said actuator is free to be depressed.

4,018,366

NOZZLE HAVING A LATERAL CHUTE OUTLET

Leonard A. Ficken, Manchester, and Gerald J. Podgorny, St. Louis, both of Mo., assignors to UMC Industries, Inc., New York, N.Y.

Filed Sept. 9, 1975, Ser. No. 611,699
Int. Cl.² G01F 11/24
U.S. Cl. 222—412 **15 Claims**



1. In apparatus for dispensing a fluent solid product comprising a receptacle for holding a supply of said product: a nozzle comprising a tubular body open at one end constituting its inner end and closed at the other end constituting its outer end, means for attaching said body on the wall of the receptacle closely adjacent the bottom of the receptacle with the open inner end of said body in communication with the interior of the receptable and with said body extending generally horizontally outward from the receptacle, said apparatus having an auger extending generally horizontally over the bottom of the receptacle into the body via the open inner end of the body, said auger being rotatable in said body free of the body and free of the outer closed end of the body, said body having a lateral outlet at one side thereof adjacent its outer end, a sleeve having a telescoping sliding fit on the tubular body and slidable onto and off of the body from the closed outer end of the body, said sleeve having a lateral opening adapted to register with said lateral outlet of said body when the sleeve is in place on the body and said sleeve further having a chute extending laterally outwardly and downwardly from said opening, whereby material fed by the auger through said body is adapted to exit sidewise from the body via said outlet, and pass via said opening in the sleeve to the chute and then down the chute, and whereby the sleeve, in being slid off the body, shears off any accumulation of product in the chute blocking said opening.

4,018,367

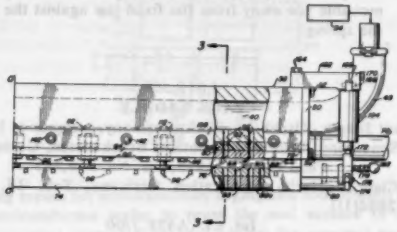
MANIFOLD DISPENSING APPARATUS HAVING RELEASABLE SUBASSEMBLY

Richard L. Morine, and James J. Hokes, both of Euclid, Ohio, assignors to Fedco Inc., Mentor, Ohio

Filed Mar. 2, 1976, Ser. No. 663,148
Int. Cl.² B67D 3/04; A21C 9/00
U.S. Cl. 222—485 **6 Claims**

1. Apparatus for dispensing fluent material in a predetermined pattern comprising:

a. a main, elongated body mounted to extend horizontally and defining a horizontal main manifold chamber;
b. a plurality of discharge passageways extending downwardly from said main manifold chamber;
c. first valve means carried by said main body for controlling flow through said passageways;
d. a dispensing outlet subassembly releasably clamped to said main body and defining a secondary manifold chamber for receiving flow from said discharge passageways;



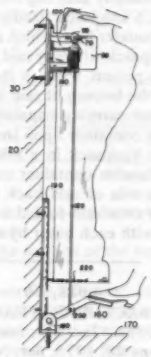
e. a plurality of dispensing orifices extending downwardly from said secondary manifold chamber and laid out in a pattern corresponding to said predetermined pattern; and,
f. second valve means carried by said subassembly and operable independently of said first valve means for controlling flow through said dispensing orifices.

4,018,368

DEVICE FOR FOLDING SHEETS AND THE LIKE

Bernhard A. Haldi, New York, N.Y., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Oct. 21, 1975, Ser. No. 624,318
Int. Cl.² A41H 33/00
U.S. Cl. 223—37 **3 Claims**



1. A device adapted to be secured both to a wall and a floor to facilitate folding of sheets and the like, said device comprising:

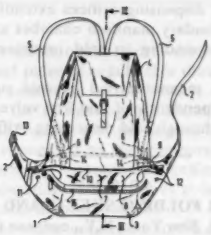
a flat plate disposed vertically and secured to said wall;
a fixed jaw extending perpendicularly outward from the wall in a vertical plane;
a movable jaw parallel to the fixed jaw and horizontally slidable along the plate toward and away from the fixed jaw, said movable jaw being slidably secured to the plate;
means secured to said plate to confine the motion of the movable jaw to the horizontal plane;
a spring biasing said movable jaw against the fixed jaw; and
a foot operated mechanism on the floor and connected to the movable jaw, said mechanism including a foot operated pedal disposed on one end of an elongated linkage,

said linkage being pivotally secured at its opposite end to the floor, a pulley lying in a vertical plane and rotatable therein, said pulley being disposed adjacent said plate and movable jaw, and a flexible cord secured at one end to a point on the linkage intermediate its ends, said cord extending vertically upwards from the linkage, engaging said pulley to the movable jaw, the other end of the cord being secured to the movable jaw, said cord being attached to the linkage to form a lever of the second class, said pedal when depressed causing said cord to pull said movable jaw away from the fixed jaw against the bias of the spring.

4,018,369
BACK SADDLE

Knut Jaeger, Kirchheim, Teck, Germany, assignor to Herbert Simon and Knut Jaeger, both of Bruckwiesen, Germany

Filed Feb. 13, 1975, Ser. No. 549,765
Claims priority, application Germany, Feb. 15, 1974, 052554[U]
Int. Cl.² A45F *3/00*
U.S. Cl. 224—9 **2 Claims**



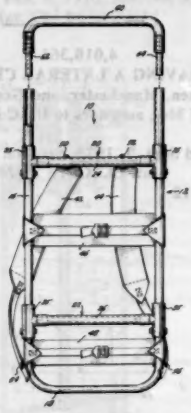
1. A back saddle comprising a back bag member worn at the rear of the waist of a person; a belt means fixedly attached to said bag member, whereby said bag member is secured to the waist of the person; a knapsack fixedly attached to said back bag member; and shoulder belts which are additionally fixedly attached to said knapsack whereby said knapsack is secured to the shoulders of the person, wherein the top side of said back bag member forms the bottom of said knapsack, wherein said knapsack has greater carrying capacity than said back bag, including a closable container upon the top side of said back bag, for storing the knapsack in a folded, compact position and wherein said closable container comprises two top flaps attached to the top side of said back bag member, said top flaps being foldable over said folded knapsack, the two flaps being connectable with each other by suitable closing means.

4,018,370
BACK PACK FRAME

Thomas E. Wood, 3863 42nd NE., Seattle, Wash. 98105

Filed June 20, 1975, Ser. No. 588,795
Int. Cl.² A45F *3/10*
U.S. Cl. 224—25 A **8 Claims**

1. A back pack frame comprising:
a generally U-shaped tubular plastic main frame member including a curved transverse bottom portion and a pair of upstanding parallel legs, each of said legs including a plurality of vertically spaced pairs of aligned holes therein;
at least one transverse support member extending between said upstanding legs a distance above said curved transverse bottom portion;
said transverse support member comprising a pair of tee connectors each having a tubular sleeve portion engageable with one of said upstanding legs and a pin portion extending normally outward from said sleeve portion, and a tubular cross member interconnecting said tee connectors in a manner such that the box ends of said cross member engage the pin portions of said tee connectors;
the pin portions of said tee connectors each having a cylindrical surface including at least one axially extending raised rib and at least one circumferentially extending raised rib protruding radially outwardly therefrom, engaging the inner walls of the box ends of said cross member to fix said tee connectors and said cross member against axial disconnection or rotation under normal pack frame use conditions, said cross member being rotatable

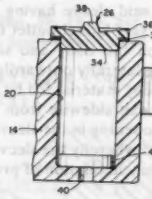


on said pin in response to above normal torque applied to said cross member and thereafter being manually rotatable to reform a connection fixed against rotation during normal pack frame use;
the tubular sleeve portions of said tee connectors including a pair of aligned holes positionable adjacent selected pairs of aligned holes on said upstanding parallel legs; and
pin means extending through said aligned pairs of holes to hold said tee connector in fixed engagement with said upstanding parallel legs.

4,018,371
BEVERAGE BELT

Stanley Ross George, 6712 Balcom Ave., Reseda, Calif. 91335

Continuation-in-part of Ser. No. 353,226, April 23, 1973, abandoned. This application July 29, 1975, Ser. No. 599,955
Int. Cl.² A45C *11/00*
U.S. Cl. 224—26 R **4 Claims**



1. A beverage belt comprising:
a belt havng a pair of free ends, securing means connected to said belt at said free ends to secure together the ends of said belt into an integral unit;
a housing having a plurality of beverage retaining pockets, said housing being attached to said belt, said pockets being spaced from each other, each said pocket being adapted to contain a beverage container;
a lid assembly including a separate lid for each of said pockets, each said lid to connect by connecting means

with said housing to close its respective said pocket to the ambient;

said housing being constructed of a plastic insulative material, each said lid being constructed of a plastic insulative material;

located within said housing and communicating with each said pocket is an aperture, there being a separate said aperture for each said pocket, each said aperture located within the bottom of each said pocket;

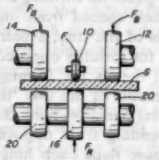
means located within each said pocket for closing each said aperture to the ambient; and

whereby an elongated object is insertable through said aperture to move a beverage container located within the said pocket upwardly and out of its respective said pocket.

4,018,372
GLASS CUTTING METHOD AND APPARATUS

Thomas A. Insolio, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.

Filed Dec. 5, 1975, Ser. No. 638,041
Int. Cl.² C03B *33/02*
U.S. Cl. 225—2 **8 Claims**



1. A method of cutting relatively thick sheets of glass, comprising

a. scoring one surface of the glass by passing a scoring tool along a line of action while

b. simultaneously bending the glass sheet about the line of action of said tool to decrease the internal compressive stresses adjacent the surface being scored

c. said bending step including the step of moving at least two pressure applying rollers along the said one surface in directions parallel that of the scoring tool but spaced therefrom, and

d. reacting the forces imposed by said rollers by moving a reaction roller along the other side of the glass generally opposite the scoring tool.

4,018,373
DEVICE FOR BONDING ELECTRODES TO SEMICONDUCTOR DEVICES

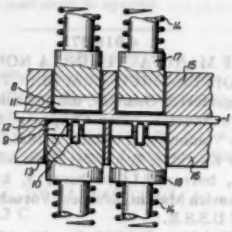
Wolfgang Beerwerth, Neheim-Husten; Albrecht Geppert, Warstein; Horst Gesing, and Rigobert Schimmer, both of Belecke, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Division of Ser. No. 484,629, June 28, 1974, Pat. No. 3,965,567. This application Oct. 31, 1975, Ser. No. 627,781
Claims priority, application Germany, June 28, 1973, 2332822
Int. Cl.² H01L *21/603*
U.S. Cl. 228—44.1 A **5 Claims**

1. A device for simultaneously soldering a plurality of contact electrodes to two sides of a semiconductor wafer comprising in combination:

first and second centering plates between which a semiconductor wafer is clamped by means of its major surfaces, each of said plates being provided with a plurality of bores which are located at positions corresponding to each of the electrodes to be soldered, each of said bores having a peripheral size and shape corresponding to the respectively associated contact electrode;

a rod slideably engaged in each of said bores, each of said rods having means, on the end surface thereof which faces the semiconductor wafer, for receiving the associated contact electrode which has been provided with solder; and

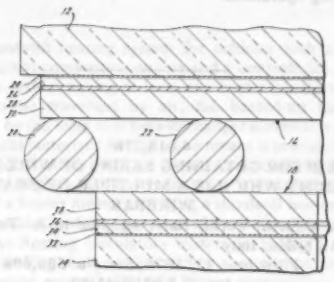


spring means for simultaneously urging said rods toward the semiconductor wafer to press the end surface of the respective contact electrodes against the opposed major surfaces of the semiconductor wafer.

4,018,374
METHOD FOR FORMING A BOND BETWEEN SAPPHIRE AND GLASS

Stuart M. Lee, Palo Alto, and Jerrett D. Stafford, Sunnyvale, both of Calif., assignors to Ford Aerospace & Communications Corporation, Dearborn, Mich.

Filed June 1, 1976, Ser. No. 691,913
Int. Cl.² B23K *1/20*
U.S. Cl. 228—121 **14 Claims**



1. A method for forming a bond between sapphire and glass comprising the steps of:

1. with respect to the surface of the sapphire to be bonded to the glass:

a. applying an inner film of metal, capable of adhering to sapphire, on said sapphire surface;

b. applying an intermediate film of metal on the exposed surface of said inner metal film;

c. applying an outer metal film on the exposed surface of said intermediate metal film;

2. with respect to the surface of the glass to be bonded to the sapphire:

a. applying an inner film of metal, capable of adhering to glass, on said glass surface;

b. applying an intermediate film of metal on the exposed surface of said inner metal film;

c. applying an outer metal film on the exposed surface of said intermediate metal film;

3. placing a metal wire between said outer metal films on said sapphire and glass surfaces and applying a force to said sapphire and glass sufficient to deform plastically said metal wire to increase substantially its surface area;

4. applying heat to said metal wire sufficient to cause it to liquify while said force is being applied; and

5. allowing the liquified metal to solidify.

4,018,375

METHOD OF MANUFACTURING A NONCONSUMABLE COPPER-ZIRCONIUM ELECTRODE

Vladislav Grigorievich Osintsev, ulitsa Lenina, 6, kv. 6; Jury Grigorievich Naumov, ulitsa Chapaeva, 5, kv. 11, both of Kolchugino Vladimirskoi oblasti; Eduard Migranovich Esibyan, ulitsa Kikvidze, 4, kv. 21, Kiev; Mikhail Evgenievich Danchenko, bulvar B.Likhacheva, 3, kv. 53, Kiev, and Vasily Berkovich Malkin, prospekt Voroshilova, 31, kv. 305, Kiev, all of U.S.S.R.

Filed Mar. 5, 1976, Ser. No. 664,072

Claims priority, application U.S.S.R., Mar. 10, 1975, 2119847

Int. Cl.² B23K *31/00*

U.S. Cl. 228—131 4 Claims

1. A method of manufacturing a nonconsumable copperzirconium electrode comprising the steps of: positioning within a copper sleeve a zirconium core and an intermediate layer to form a three-component blank, said intermediate layer being made of a cold-deformed copper and having a thickness substantially equal to the diameter of said core; deforming said three-component blank, the deformation of said threecomponent blank being performed successively by, first, joint cold deformation of said intermediate layer on said core and, then, by their hot deformation jointly with said sleeve; and subjecting the thus produced blank to machining, following the said deforming operations.

4,018,376

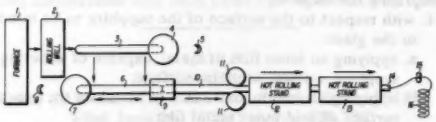
PROCESS FOR OBTAINING SKEINS OF WIRE ROD OF A WEIGHT WHICH IS A MULTIPLE OF THAT OF A WIREBAR

Raffaele Capetti, Turin, Italy, assignor to A. Tonolli & C. S.p.A., Milan, Italy

Filed June 13, 1975, Ser. No. 586,608

Int. Cl.² B21B *15/00*

U.S. Cl. 228—158 4 Claims



1. A continuous process for obtaining a copper skein from wirebars, comprising the ordered steps of:

a. preheating each wirebar to a normal hot rolling temperature;

b. continuously rough rolling the wirebars at the hot rolling temperature to reduce each wirebar to substantially identical size and shape;

c. cropping first and second ends of each wirebar;

d. butt welding at the hot rolling temperature the first end of one wirebar to the second end of another wirebar while pressing these two ends together;

e. continuously hot rolling the welded wirebars to a required size and length to finish the welded wirebars; and

f. winding the finished welded wirebars into a skein having a weight which is a multiple of the weight of a wirebar.

4,018,377

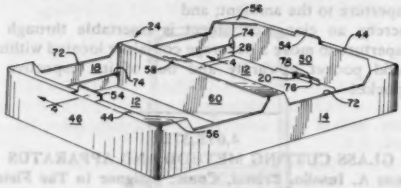
COMPARTMENTED TRAY HAVING IMPROVED DIVIDER MEANS

Ronald I. Kent, Whittier, and Albert R. Brown, Hughson, both of Calif., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Apr. 8, 1976, Ser. No. 675,044

Int. Cl.² B65D *5/48*

U.S. Cl. 229—27 18 Claims



1. A blank for forming a tray having at least two compartments, comprising a plurality of panels, adjacent ones of the panels being hingedly interconnected, the panels being provided by a bottom panel for forming a bottom wall of the tray, a pair of side panels spaced from one another for forming opposed side walls of the tray, a pair of end panels spaced from one another for forming opposed end walls of the tray, and divider panel means for forming a divider separating adjacent compartments of the tray, the divider panel means comprising a central panel bridging the side panels, a pair of lateral panels extending from opposite sides of the central panel, a pair of base flaps each hingedly extending from a respective one of the lateral panels at a side thereof opposite the central panel, and a pair of locating tabs each projecting from a respective one of the lateral panels at said side thereof, the bottom panel having formed therein a pair of locating slots spaced from one another and each disposed to receive a respective one of the locating tabs when a tray is erected from the blank, the sum of the widths of the base flaps being not greater than the distance between the locating slots in the longitudinal direction relative to the bottom panel.

4,018,378

CARTON TRAY WITH COVER

Karl Rune Persson, Halmstad, Sweden, assignor to Sprinter Pack AB, Halmstad, Sweden

Filed Mar. 24, 1976, Ser. No. 669,860

Claims priority, application Sweden, Apr. 3, 1975, 7503827

Int. Cl.² B65D *5/24*, *5/22*

U.S. Cl. 229—31 R 4 Claims

1. A carton comprising:

a cover having a base and downwardly depending side walls

which form a continuous frame around the edges of said cover base; said side walls of said cover being extended at their ends with end flaps lying along the inside of said frame formed by said side walls of said cover; at least some of said end flaps having a locking edge which is substantially parallel to said cover base and at a predetermined distance below it;

a tray including a tray base and side walls depending upwardly therefrom; said side walls of said tray being fixedly connected to each other by means of a corner construction consisting of a corner wall which forms a part of the inside of said tray and with its side edges engage against the inside of said side wall on either side of said corner; said side edges of said corner wall and the ends of contiguous side walls of said tray being united by means of an intermediate portion lying along the inside of the respective contiguous side wall; said side walls of said tray each including an edge flange lying in a plane substantially parallel to said tray base, said edge flanges being fixedly united to each other by each corner wall being extended with a communicating panel at its upper edge which lies on top of adjacent and portions of said side wall edge flanges and is sealed to them; the end edges of adjacent side walls of said tray being separted such that the bottom edge of each said corner wall forms an obliquely extending bottom edge uniting the ends of the bottom edges of adjacent side walls; each of said edge flanges and said communicating panels being extended with an edge flap which can be folded down along a score line lying along the outer edge of the respective edge flange or communicating panel so that when said cover is placed onto said tray, said edge flaps of said tray will be turned down by said side walls of said cover to give the edge portion of said tray a U-profile with relatively great resistance to bending when said cover is in said tray;

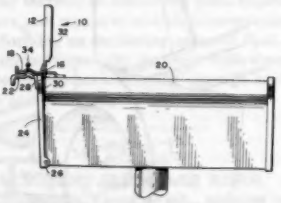
at least some of said edge flaps of said tray having a downwardly turned locking edge for cooperation with a corresponding locking edge of one of said end flaps of said cover in such a way that when said cover is pressed down into said tray, the respective locking edge of said cover passes over said locking edge of an adjacent edge flap of said tray so that said end flap of said cover snaps into position and said locking edges of said tray and cover come into locking abutment with each other.

4,018,379

MAILBOX SIGNAL DEVICE

Lewis D. Carter, 4990 Central Ave., McKinleyville, Calif. 95521

Filed Mar. 23, 1976, Ser. No. 669,511
Int. Cl.² B65D *91/00*
U.S. Cl. 232—35 **5 Claims**



1. A signal device for a mailbox having a pair of forwardly protruding, engageable latch straps on the box and door, respectively, said signal device comprising:

a plate;

a slot in said plate through along and adjacent the bottom edge thereof adapted to be received freely on the latch strap on said box; and

portions of said plate along said bottom edge being adapted when said plate is held upright to be disposed below the upper surface of said box for engagement by said door when said latch straps are engaged;

said portions being disposed laterally of said slot to avoid interference with said box latch strap when said plate pivots downward.

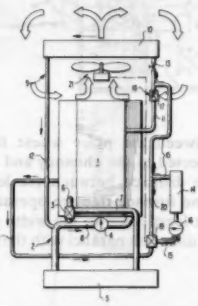
said plate being unsupported and free to pivot downward by gravity when said door is opened.

4,018,380

HEATER FOR VEHICLES

Kurt Baier, Sindelfingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 13, 1974, Ser. No. 523,413
Claims priority, application Germany, Nov. 17, 1973, 2357497
Int. Cl.² B60H *1/02*
U.S. Cl. 237—12.3 C **18 Claims**



1. A standstill heating system for vehicles with a liquid-cooled internal combustion engine and a controllable heating circulatory system having at least one heat-exchanger means adapted to be traversed by air, the heated-up air being adapted to be fed from said heat-exchanger means to a passenger space, characterized in that a line means is provided which is in communication with the liquid jacket of the internal combustion engine and which includes a circulating pump means and a heater means providing a standstill heater operation independently of the operation of the internal combustion engine, said heating circulatory system including a control means controlling the quantity of flow through the adjoining heat-exchanger means, said line means terminating in said heating circulatory system upstream of said control means, and a closure valve means arranged in the circulatory system upstream of the place where said line means terminates in the heating circulatory system, said closure valve means preventing by-passing of the heat-exchanger means during standstill heater operation by a return flow of the heated-up cooling liquid to the internal combustion engine.

4,018,381

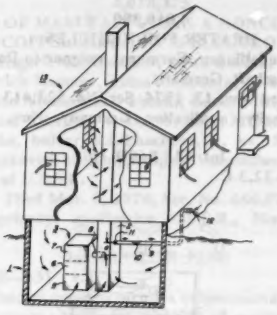
APPARATUS FOR INCREASING THE EFFICIENCY OF HEATING SYSTEMS FOR BUILDINGS

Frank A. Bisegna, Salem, Mass., assignor to Red Top Fuel Company, Salem, Mass.

Continuation of Ser. No. 350,940, April 13, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,436
Int. Cl.² F24B *7/00*
U.S. Cl. 237—55 **2 Claims**

1. Apparatus for reducing convection currents into and throughout the interior of a building having a furnace comprising a flue for discharging hot furnace gases to the outside of the building during and after the furnace is in operation, said flue having a need for replacement air as hot furnace gases are discharged, at least a portion of said replacement air being obtainable by the flue directly from the air filling the

interior of the building, and passage means for bringing air located outside the building into the flue adjacent to the location where the hot exhaust gases enter the flue, said flue comprising a furnace flue and a chimney and said chimney having a furnace end and an exterior end, said passage means being operatively connected to the chimney in the vicinity of the location where the furnace flue is operatively connected to



the chimney between the place where the furnace flue is operatively connected to the chimney and the exterior end of the chimney, the distance between the locations where the passage means and furnace flue are operatively connected to the chimney is at least equal to the width of the furnace flue measuring in the direction parallel with the longitudinal axis of the chimney.

4,018,382

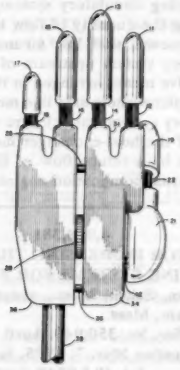
GLOVE FORM

Patsy DiCuya, 4757 Kovall, Las Vegas, Nev. 89109

Filed Oct. 15, 1975, Ser. No. 622,671

Int. Cl.² A41D *1/00*

U.S. Cl. 223—78 **5 Claims**



1. A glove form comprising first and second hand portions and adjustable means connecting said hand portions for varying the distance therebetween whereby the width of said glove form may be expanded or contracted, finger portions extending from the hand portions, threaded means connecting each finger portion and a hand portion, and a thumb portion pivotally secured to one of the hand portions.

4,018,383

PROCESS FOR PRODUCTION OF DROP STREAMS

Anthony David Paton, Chesterton Hall Cresent, and Roger John Rowland, Longstanton, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed June 2, 1975, Ser. No. 582,881

Claims priority, application United Kingdom, June 5, 1974, 24889/74

Int. Cl.² B05B *17/06*

U.S. Cl. 239—4 **2 Claims**

1. A process for the production of drop streams by modulating a liquid jet issuing from a nozzle wherein a liquid under pressure is supplied to a chamber which is fitted with a nozzle from which the liquid issues in the form of a jet, and a piezoelectric crystal which surrounds the nozzle or forms a part of a wall of the chamber has applied to it simultaneously a high frequency alternating signal of the fundamental frequency which causes drop formation and a second high frequency alternating signal the frequency of which is twice that of the fundamental signal.

4,018,384

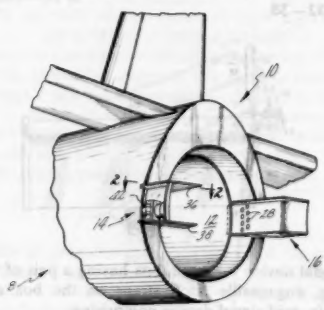
FLOW ATTACHMENT DEVICE FOR THRUST VECTOR CONTROL

Robert Edward Fitzgerald, Wethersfield, and Robert Frederick Kampe, West Hartford, both of Conn., assignors to Chandler Evans Inc., West Hartford, Conn.

Filed Feb. 13, 1976, Ser. No. 657,751

Int. Cl.² B63H *11/10*

U.S. Cl. 239—265.19 **6 Claims**



1. A thrust vector control system for generating control forces comprising:

an exhaust nozzle for directing an exhaust stream rearwardly along its longitudinal axis;

means to produce a flow through the exhaust nozzle;

a frame with longitudinally extending sides having an attachment surface defined between the sides thereof, mounted upon the nozzle such that the attachment surface extends outwardly in a radial direction with respect to the longitudinal axis of the nozzle and rearwardly from the rear end of the nozzle in the direction of the longitudinal axis of the nozzle, a front portion of the attachment surface being adjacent the rear end of the nozzle wall so that an exhaust stream emanating therefrom may attach to the attachment surface;

a pair of longitudinally extending side plates mounted upon the sides of the frame projecting radially inwardly toward the longitudinal axis of the nozzle such that a flow channel is defined by the inboard surfaces of the side plates and the attachment surface, the flow channel being positioned to receive only an annular sector of the exhaust stream when the exhaust stream is attached to the attachment surface and when the exhaust stream is detached from the attachment surface and the flow channel being of sufficient radial depth to permit ambient pressure at the attachment surface to detach the exhaust stream therefrom; and

passage forming means for establishing and terminating fluid communication between the attachment surface and the ambient atmosphere so that the annular exhaust stream sector may be respectively separated from or attached to the attachment surface.

4,018,385

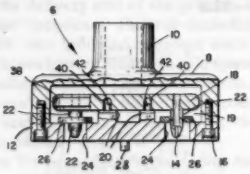
OSCILLATING SPRAY HEAD

Leonard Bruno, 87 Lambert Ave., Farmingdale, N.Y. 11735

Filed Nov. 6, 1975, Ser. No. 629,487

Int. Cl.² B05B 1/34

U.S. Cl. 239—102 **7 Claims**



1. An oscillating spray head for securing to a source of fluid under pressure comprising a spray housing provided with an inlet and outlet and an inner wall, a cover secured to said outlet, said cover having a plurality of apertures therethrough disposed spacedly of said outlet and an outer edge portion, said cover having an inner face formed with spaced bars extending midway thereof, an oscillating plate superimposed on said spaced bars, and means in said plate cooperating with said apertures for forming an oscillating spray of fluid comprising a plurality of circumferentially disposed hollow posts integral with said plate, said posts extending through said plate into said apertures and being aligned therewith.

4,018,386

RESILIENT SPRINKLER RISER

Gary Douglas Barichello, Pasco, Wash., assignor to Michener Associates, Inc., Pasco, Wash.

Filed Mar. 8, 1976, Ser. No. 665,092

Int. Cl.² B05B 3/02

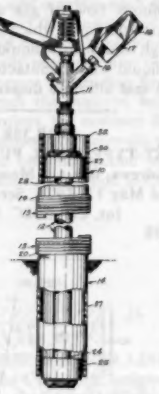
U.S. Cl. 239—200 **8 Claims**

1. A resilient sprinkler riser comprising:

an elongated flexible water supply tube having a desired exterior diameter adapted to be connected to a water supply pipe at a lower end and extending upward therefrom to an upper end for receiving a sprinkler head;

an elongated resilient closed coil spring having an interior diameter greater than the exterior diameter of the water supply tube and extending between a lower end and an upper end and adapted for mounting coaxially about the water supply tube;

mounting means for mounting the closed coil spring coaxially about the water supply tube with the lower end of the closed coil spring being held in relation to the water supply tube and with the upper end of the closed coil spring being free to move axially with respect to the water supply tube when the upper end of the water supply tube



is laterally deflected with respect to the lower end of the water supply tube; and

said closed coil spring being sufficiently pretensioned along its length to: (a) hold the flexible supply tube in an upright condition against normal radial reaction forces applied to the tube by an operating sprinkler head, (b) allow lateral resilient deflection of the tube along its length in response to forces exceeding the normal reaction forces, and (c) return the tube to an upright condition after such deflection.

4,018,387

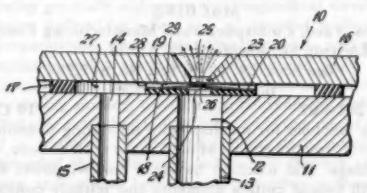
NEBULIZER

Elisha W. Erb, 444 Main St., Fitchburg, Mass. 01420, and Darrel R. Resch, 30 Walnut St., Leominster, Mass. 01453

Division of Ser. No. 588,353, June 19, 1975. This application July 1, 1976, Ser. No. 701,913

Int. Cl.² B05B 7/10, 7/04, 1/32

U.S. Cl. 239—405 **29 Claims**



1. A nebulizer device capable of reducing a flowable liquid to an ultrafine dispersion of liquid particles having an average diameter of less than about 10 microns and a maximum diameter below about 20 microns in a propellant gas, comprising a compartment adapted to contain a supply of flowable liquid, one or more small liquid orifices having a restricted width

communicating with said compartment and adapted to permit said liquid to pass therethrough from said compartment as a liquid stream less than about 0.01 inch thin, said liquid orifice comprising the space between a pair of closely-spaced members, at least one of said closely-spaced members being a flexible member which is adapted to gradually further change the width of said orifice under the effect of gradual changes in the force of said gas and/or of said liquid whereby the force of said gas and/or said liquid can be adjusted to provide the width of said liquid orifice which will permit said liquid to pass therethrough from said compartment at the desired thinness, a conduit associated with said liquid orifice and adapted to supply a continuous flow of gas across said liquid orifice whereby said flowable liquid which passes from said compartment and through said narrow liquid orifice forms a very thin stream of said liquid which contacts said flowing gas in said conduit to form said ultrafine dispersion.

4,018,388

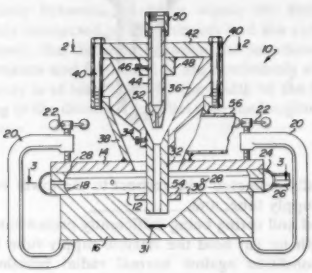
JET-TYPE AXIAL PULVERIZER

Norwood H. Andrews, Box 68, Moorestown, N.J. 08057

Filed May 13, 1976, Ser. No. 686,153

Int. Cl.² B02C *19/06*

U.S. Cl. 241—39 **8 Claims**



1. A grinding and classifying mill comprising a generally circular chamber defined by an upper wall, a lower wall, and a peripheral wall, said peripheral wall having a plurality of gaseous fluid nozzles arranged to propel gaseous fluid in both a forward and a transverse direction relative to the axis of said chamber to form a fluid vortex in said chamber, said nozzles being connected to a source of gaseous fluid under pressure, a generally conical recess in the central portion of said lower wall, a feed inlet means in the axial plane of said chamber, said feed inlet means having its outlet end aligned with the apex end of said recess, said feed inlet means being coaxial with an exhaust means leading from the central area of said chamber.

4,018,389

HIGH PRODUCTION MECHANICAL SEPARATOR MACHINE

Stephen A. Paoli, c/o Stephen Paoli Manufacturing Company, 2531 Eleventh St., Rockford, Ill. 61108

Filed Sept. 29, 1975, Ser. No. 617,787

Int. Cl.² B02C *21/00*

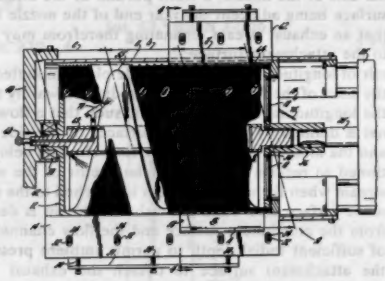
U.S. Cl. 241—67 **10 Claims**

1. In a machine for mechanically separating comminuted edible meat from fragments of hard tissue such as bone, sinew and cartilage, said machine having a hollow, power driven rotor with helical cutting elements and initially constricted helical passages communicating with the interior thereof, and a pressure bar extending axially of said rotor spaced from the periphery thereof by an amount not substantially greater than the initial constriction of said helical passages, the combination comprising:

a. a generally cylindrical casing surrounding said power driven rotor, said casing having a feed opening adjacent the driven end of the rotor;

b. an upstanding hopper disposed in register with said feed opening;

c. means defining a relatively deep arcuate digesting pocket in said casing extending from said feed opening around at least 180° of rotor circumference;



d. means for restricting the rotor clearance with respect to said casing at the end of the pocket remote from the pressure bar; and

e. a plurality of breaker teeth formed in the peripheral portion of certain of said helical cutting elements in the region of said arcuate digesting pocket.

4,018,390

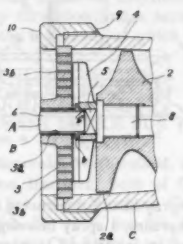
SLEEVE FOR USE IN A MEAT CHOPPER

Shinnosuke Funakubo, 3-6-1, Gyotoku Ekimae, Ichikawa, Chiba, Japan

Filed Jan. 22, 1976, Ser. No. 651,352

Int. Cl.² B02C *18/36*

U.S. Cl. 241—82.5 **3 Claims**



1. In a meat chopper having a housing, an auger rotatable in a chamber in said housing to drive meat which is to be ground from an opening in one end of the chamber toward a perforated grinder plate which is secured over an opening in the opposite end of chamber, a stud shaft releasably secured at one end to said auger and having on its opposite end a cylindrical journal portion which projects coaxially and rotatably through a bore in said grinder plate, and a rotary knife releasably secured to said stud shaft intermediate the ends thereof for rotation thereby adjacent the inside surface of said grinder plate, the improvement comprising

a bearing member having on one end a tubular portion surrounding said cylindrical portion of said shaft and projecting movably into one end of the bore in said grinder plate coaxially thereof, and

means releasably connecting the opposite end of said bearing member to one end of said knife whereby the rotation of said knife is imparted to said bearing member,

said tubular portion of said bearing member having an outside diameter less than the diameter of said bore in said grinder plate, whereby said tubular portion is disconnected from said grinder plate, and is rotatable in the bore thereof by said blade.

4,018,391
CONTROLLED HAY BALE METERING AND FEEDING DEVICE

Ralph O. Jacobsen, Kyle, Saskatchewan, Canada (Solito)

Filed May 12, 1975, Ser. No. 576,783
Claims priority, application Canada, May 24, 1974, 200739
Int. Cl.² B02C 18/16
U.S. Cl. 241—152 A 3 Claims

1. A device for the metering and positive feeding of hay bales comprising:

a. a primary conveying channel having a receiving end and a delivery end;

b. means adjacent the receiving end of the primary channel for receiving and metering a hay bale placed therein;

c. a secondary conveying channel extending from the delivery end of the primary channel and being inverted with respect thereto, said secondary conveying channel including a top wall and side walls inverted with respect to the primary channel;

d. means in the primary channel for conveying a metered bale from the receiving end to the delivery end of the channel;

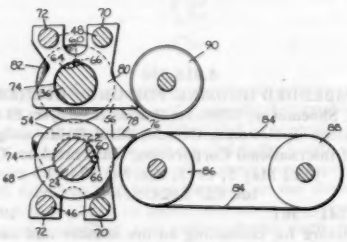
e. means in the secondary channel, operating in conjunction with the primary channel conveying means, for receiving the metered bale material and positively conveying the same from the delivery end of the primary channel, said means in the secondary channel including a pair of spaced shafts, one mounted adjacent each end of said secondary channel, drive means on said spaced shafts and chains extending between said drive means and carrying pushing means thereon adapted to positively convey sections of said bale carried thereto by the conveying means in the primary channels; and

f. power means for operating the metering and conveying means.

4,018,392
SHREDDING MACHINE

John W. Wagner, Murrysville, Pa. 15668

Filed Dec. 22, 1975, Ser. No. 643,335
Int. Cl.² B02C 18/14
U.S. Cl. 241—167 10 Claims

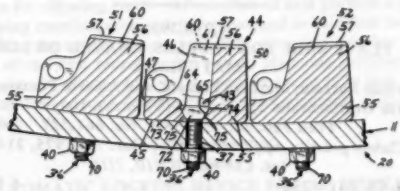


1. A shredding machine having a housing, a first and a second parallel spaced apart rotatably driven shafts rotatably mounted in said housing at end plates fixedly attached to said housing, driving means in said housing and operably connected to said shafts to drive said shafts counter to each other, a plurality of interfitting cutters having annular cutting surfaces disposed on said shafts and locked relative to said shafts to rotate therewith by locking means, at least two support rods fixedly attached at their ends to said end plates, said support rods being parallel to each other and to said first and second shafts, a comber interposed between each said cutters, each said comber having at least two openings therethrough, one said support rod in registration with and of slightly smaller diameter than one of said openings to provide mechanical support for each said comber, said first and second shafts in registration with and of slightly smaller diameter than another of said openings in each said comber to provide further mechanical support for each said comber, each said comber free floating along the axis of said first and second shafts and said support rods to which said comber is coupled, but mechanically supported substantially perpendicular to said axis, each said comber having a tongue protruding forwardly of said cutters to comb and direct the material being fed to said cutting surfaces of said cutters, the combers disposed on said first shaft having faces opposed and generally parallel to faces on the combers disposed on said second shaft, said faces defining the shredding path through said machine.

4,018,393
MOUNTING FOR GRINDER LINERS

Darrell R. Larsen, Salt Lake City, Utah, assignor to Minneapolis Electric Steel Casting Company, Minneapolis, Minn.

Filed Nov. 6, 1975, Ser. No. 629,503
Int. Cl.² B02C 17/22
U.S. Cl. 241—182 7 Claims



1. In combination:

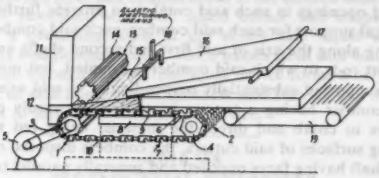
a liner for a grinding mill comprising a casting of tough, abrasion resistant material having a longitudinal axis, inner and outer grinding and mounting surfaces respectively, and a plurality of mounting apertures spaced axially therealong and extending from said grinding surface through said mounting surface, each of said apertures being generally oblong in the longitudinal direction and being defined by a first pair of opposed walls generally perpendicular to and extending through to said mounting surface, and a second pair of opposed walls tapering inward at least in part toward and extending through said mounting surface, the distance between the walls of said first pair extending in the direction of the axis of the liner;

and a plurality of mounting bolts each comprising a threaded shank dimensioned to pass through said aperture and extend beyond said mounting surface, and a head having a first pair of opposed surfaces generally conforming in shape to the first pair of aperture walls, the distance between the first pair of aperture walls being sufficiently large relative to that of the first pair of bolt head surfaces to permit adjustable bolt head movement in the longitudinal direction, and a second pair of opposed surfaces tapering inward for conforming engagement with the second pair of aperture walls.

4,018,394
SHREDDING MACHINE FOR FIBROUS MATERIALS

Pierre Sorbier, Pernes-les-Fontaines, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Nov. 24, 1975, Ser. No. 634,344
Claims priority, application France, Nov. 25, 1974, 74.39951
Int. Cl.² B02C 19/00
U.S. Cl. 241—200 12 Claims



1. Machine for shredding fibrous material, said machine comprising:

an endless belt carrying defibering gouges, front and rear shafts over which said belt travels, to form an upper lap above said shafts and a lower lap beneath them,

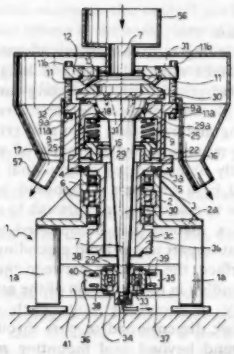
stop means positioned near that end of the upper lap toward which said upper lap travels, to receive the end of the unshredded fibrous material and prevent its passage therebeyond,

and a member closely adjacent said upper lap which permits the passage of shredded material therethrough but prevents the passage of large chips, said member having an arcuate surface defining, with the portion of said belt passing over said front shaft, a narrow gap sufficient to prevent said gouges from striking said arcuate surface, but insufficient to pass large chips.

4,018,395
PLATE MILL FOR PEBBLES, GRAVEL OR LIKE MATERIALS

Tarcisio Pozzato; Mariano Pozzato, and Alberto Pozzato, all of Via Grattacavallo 2, Sandrigo (Vicenza), Italy

Filed Feb. 25, 1976, Ser. No. 661,327
Claims priority, application Italy, Mar. 20, 1975, 21468/75
Int. Cl.² B02C 7/10, 7/16
U.S. Cl. 241—252 6 Claims



1. In a plate mill for gravel or like materials, of the type comprising:

a support structure,

a first crusher plate mounted on said support structure for rotation about an axis perpendicular to said plate,

a second crusher plate carried on said support structure facing said first plate,

a shaft carried by said support structure so as to be rotatable about its longitudinal axis and angularly adjustable in relation to the axis of rotation of said first plate, said shaft carrying said second plate at one end thereof for rotation about the axis of said shaft perpendicular to said plate, and

means for driving one of said two plates to rotate,

the improvement wherein there is provided:

a cylinder carried by said support structure coaxial with said first plate and surrounding a portion of said shaft at the upper end thereof,

an inner sleeve fixed to said support structure at one end of said cylinder, said inner sleeve defining, with said cylinder, an annular chamber coaxial with said cylinder, said annular chamber being closed by said support structure at the end remote from said second plate,

a piston assembly with an annular cross-section rotatably and axially slidable within said cylinder and extending into said annular chamber,

a first member of said piston assembly having means defining a part-spherical socket in the end thereof nearest said second plate, said part-spherical socket having means defining a central opening therein larger than the diameter of said shaft,

said shaft extending through said opening,

an enlarged, part-spherical head on the end of said shaft, said part-spherical head being engaged in said part-spherical socket,

means defining an annular groove extending around said part-spherical head coaxially with respect to the axis of said shaft,

means defining a first lubricant conduit in said annular piston said first lubricant conduit communicating at one end thereof with said annular chamber, and at the other end thereof with said annular groove in said part-spherical head of said shaft,

a lubricant reservoir,

means defining a second lubricant conduit in said shaft, said second lubricant conduit communicating at one end thereof with said annular groove in said part-spherical head of said shaft, and at the other end with said lubricant reservoir, and

means for pressurising said lubricant in said reservoir whereby to urge said piston assembly, carrying said second plate, towards said first plate whereby to position said two plates a selected distance apart.

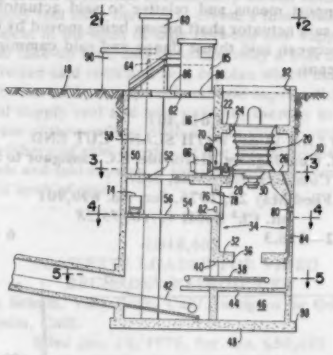
4,018,396
EMBEDDED HOUSING FOR ORE CRUSHER

Robert S. Shoemaker, Millbrae; Donald H. Moyer, El Cerrito, and Joseph J. Newman, Orinda, all of Calif., assignors to Bechtel International Corporation, San Francisco, Calif.

Filed May 5, 1975, Ser. No. 574,217
Int. Cl.² B02C 23/00
U.S. Cl. 241—301 17 Claims

1. Structure for containing an ore crusher and associated ore handling equipment below ground level comprising: a hollow, concrete housing having a pair of upright tubular segments and a common wall between the segments at the region of intersection thereof, the segments having convex outer surfaces and defining with the wall a generally figure eight configuration, the housing adapted to be disposed below ground level and having a floor disposed within and integral

with one of the segments for supporting an ore crusher, said floor having an opening therethrough, the ore crusher being



operable to discharge through said opening when the ore crusher is supported by said floor.

4,018,397

UNFURLING DEVICE FOR TUBULAR EXTENDIBLE STRUCTURES

Dieter Rüsch; Heinz Glüser, both of Wedel, Holstein, and Otto Lübcke, Hamburg, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Mar. 18, 1976, Ser. No. 668,074

Claims priority, application Germany, Mar. 25, 1975, 2513080

Int. Cl.² B65H *75/38*; E04H *12/18*

U.S. Cl. 242—54 A **6 Claims**

1. A system for establishing tubular structures comprising: two pairs of elongate strips of elastically deformable material, each said strip having been fabricated to normally assume the form of a tube having an axis parallel to the length of said strip and being capable of being coiled about an axis perpendicular to such tube axis and being flattened in the direction of its width while retaining its ability to assume the form of a tube upon being uncoiled; two coiling drums each arranged to receive a respective pair of said strips and each rotatable in a coiling direction of rotation for simultaneously coiling the strips of its respective pair about an axis perpendicular to the lengths of said strips, and in an uncoiling direction of rotation for simultaneously uncoiling the strips of its respective pair; said drums being laterally spaced from one another and being aligned so that the longitudinal center lines of said strips on said drums lie in a common plane; and means defining two guidance exit openings each receiving a respective strip of each said pair in a manner such that during rotation of said drums in their respective uncoiling directions, portions of the two said strips received by each said opening assume the form of a tube and become interengaged to form a dual tubular member.

4,018,398

WINDING HUB FOR A RECORD CARRIER IN THE FORM OF A TAPE

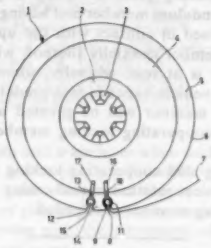
Friedrich Louzil, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 30, 1975, Ser. No. 618,217

Claims priority, application Austria, Oct. 3, 1974, 7982/74

Int. Cl.² B65H *75/28*

U.S. Cl. 242—74.1 **2 Claims**



1. A winding hub assembly for a tape comprising a hub having a circumference, and first and second recesses having walls and terminating at said circumference, each recess having a restriction at the respective termination, said recesses defining a hub portion therebetween; said hub comprising means for allowing elastic deformation of said portion; a first clamping member arranged to be clamped in said first recess for clamping a tape between the first clamping member and walls of the first recess; and a second clamping member arranged to be clamped in said second recess so as to bias said portion toward said first recess, thereby clamping said first member.

4,018,399

AUTOMATIC LOCKING DEVICE FOR A VEHICLE SAFETY BELT

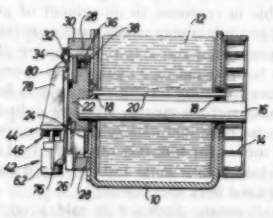
Gert Ingmar Rex, 84 Stenhuggarvagen, 302 40 Halmstad, Sweden

Continuation of Ser. No. 386,380, Aug. 7, 1973, abandoned. This application May 7, 1975, Ser. No. 575,250

Claims priority, application Sweden, Aug. 9, 1972, 10354/72

Int. Cl.² A62B *35/02*; B65H *75/48*

U.S. Cl. 242—107.4 A **8 Claims**



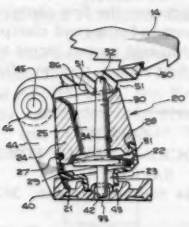
4. An automatic locking device for a safety belt of the type intended to retain a person in a vehicle, comprising

a casing fixedly secured in the vehicle,

a shaft rotatably mounted in said casing,

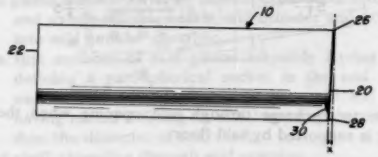
a belt wound on said shaft,
a coil spring secured at opposite ends to said shaft and casing for winding said belt on said shaft, and
a locking mechanism actuatable, when change of speed of the vehicle exceeds a predetermined g-value, to lock said shaft against rotation, comprising
a bridge member secured in said casing,
a cylindrical pendulum member suspended from said bridge member for universal movement thereon in all directions about points offset equally from a vertical reference line which passes through the center of gravity of said pendulum member when said pendulum member is at rest,
a pivoted movement about an axis extending transverse to and laterally offset from said vertical line,
a cooperating locking member positioned to be engaged by said pivoted locking member, and normally to be rotatable with said shaft,
said pivoted locking member being disposed vertically above said pendulum member and having on its underside a point disposed in contact with the upper end of said pendulum member coaxially thereof, when said pendulum member is at rest, whereby, when the change of speed of the vehicle exceeds said predetermined g-value said locking member will be pivoted about its axis to engage said cooperating locking member and retard its rotation, and
means engaging said cooperating locking member to lock said shaft against rotation in said casing when said cooperating locking member is retarded.

4,018,400
VEHICLE INERTIA SENSORS
Cyril Henderson, Woodland Hills, Calif., assignor to American Safety Equipment Corporation, Encino, Calif.
Filed Aug. 11, 1975, Ser. No. 603,519
Int. Cl.² A62B *35/02*; B65H *75/48*
U.S. Cl. 242—107.4 A **17 Claims**



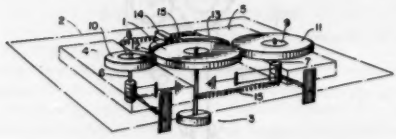
1. In a seat belt webbing retractor for a vehicle for preventing protraction of said webbing when the vehicle undergoes changes in momentum above a predetermined level, the retractor including a retractor frame, a lockable belt storage reel and associated reel lock actuating means including lever means moveable in response to movement of an associated inertia sensing pendulum means, the improvement in such reel lock actuating means comprising the provision of:
a pendulum body including a light weight apertured base of cup-like configuration having an interiorly formed actuator camming surface means, a hollow cylindrical inertia sensing mass of a material relatively heavier than said base and means for securely attaching said mass to said base with said hollow mass and apertured base providing a vertical axial bore therethrough;
actuator shaft means disposed in said axial bore of said pendulum body and including a thrust flange intermediate its upper and lower ends, said flange being contained within said pendulum body and normally resting on said actuator camming surface means and with said upper end extending outwardly of said mass; and
support means on said retractor for supporting said pendulum body with said actuator shaft means upper end positioned for moving said lever means to cause lockup of said retractor upon movement of said pendulum body on said support means and relative to said actuator shaft means, said actuator shaft means being moved by engagment between said thrust flange and said camming surface means.

4,018,401
YARN TUBE WITH SLANT CUT END
McCleery B. Cunningham, Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.
Filed May 28, 1976, Ser. No. 690,901
Int. Cl.² B65H *75/10*, *75/28*
U.S. Cl. 242—118.3 **6 Claims**



1. A yarn tube for use on a winding spindle having cutting means thereon, said yarn tube including a linear axis and first and second ends, said ends being planar and oriented at different angles to the linear axis of the tube, the plane of one of said ends forming an acute angle with a plane perpendicular to the linear axis whereby, upon the abutment of the first end of the tube with the second end of a duplicate tube in axial alignment therewith, an abutting surface and a space will be provided between the abutted tube ends with the space extending about a significant portion of the circumference of the tubes in the area of the abutment for passage of yarn therethrough and into engagement with spindle mounted cutting means.

4,018,402
TAPE TRANSPORT APPARATUS
Donald L. Burdorf, Newport Beach, Calif., assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany
Filed May 6, 1975, Ser. No. 574,958
Int. Cl.² G03B *1/04*; G11B *15/32*
U.S. Cl. 242—192 **18 Claims**



5. In a reversible tape transport of the type having reels which alternately serve as supply and take-up reels on shafts rotatably mounted on supports movable toward and away from a driving capstan having a resiliently deformable peripheral portion and being rotatably mounted on the tape transport base,
the improvement that said transport comprises:
a coupling means including a unidirectional clutch on each of said shafts, each said coupling means having an element coaxial with the corresponding shaft and arranged for free rotation in one direction, and
an elongated flexible brake member/resilient means combination for each of said shafts, both ends of said combination being anchored at said tape transport and at least one of said ends at said base thereof, and each said flexible brake member being at least partially wrapped around said one element of the corresponding coupling means,

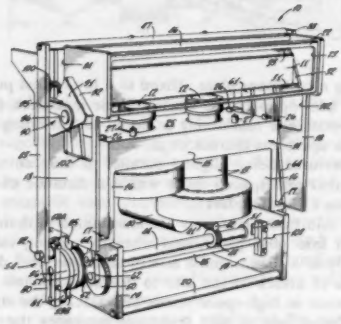
such that, due to the joint action of said coupling means and said brake member/resilient means combination, a braking action is exerted substantially on the rotation of said supply reel only, thereby to create a first tensioning component in the span of tape between said supply reel and said take-up reel, and simultaneously a bias is generated between said reels and said capstan which bias is greater between said take-up reel and said capstan than between said supply reel and said capstan, thereby to create, by virtue of the resultant difference in the deformation of the periphery of said capstan at the interfaces between said reels and said capstan, a second tensioning component in said span of tape.

4,018,403

CASSETTE LOADER FOR VIDEO RECORDER/REPRODUCER

Gordon Schulz, Villa Park, Calif., assignor to Odetics, Inc., Anaheim, Calif.

Filed Jan. 19, 1976, Ser. No. 650,455
Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*
U.S. Cl. 242—198 **17 Claims**



1. A loading mechanism for delivering a standard video cassette onto a pair of reel drive hubs comprising:

means for receiving said video cassette, said receiving means including an open shelf having a bottom and opposed side walls;

means for lowering said receiving means shelf and said video cassette therein onto said drive hubs, said drive hubs extending through a pair of openings in said shelf bottom;

support means extending through said shelf bottom, adjacent the four corners thereof, for contacting the bottom of said cassette in the lowered position of said shelf;

means contacting the top of said cassette for clamping said cassette down onto said support means; and

means operative when said receiving means shelf reaches said lowered position for momentarily applying a force to said top of said cassette, directly above the reels therein, to force said reels onto said reel drive hubs.

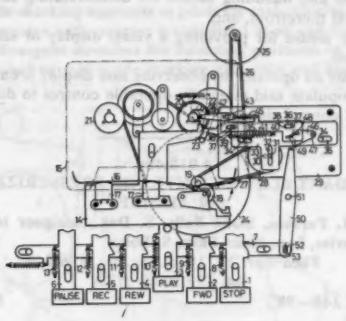
4,018,404

AUTOMATIC TAPE STOPPING DETECTIVE DEVICE IN A MAGNETIC RECORDING AND REPRODUCING APPARATUS

Yasuo Sami, Yamatotakada, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

Filed June 4, 1975, Ser. No. 583,695
Claims priority, application Japan, June 11, 1974, 49-66718
Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*
U.S. Cl. 242—200 **8 Claims**

1. An automatic tape stopping detective device in a magnetic recording and reproducing apparatus which detects the stopping of the run of the tape, comprising a take-up reel disk means which rotates with the run of the tape, a crank pulley means which always rotates whether the tape is running or not, a main lever operatively associated with a sliding mechanism, said means lever being driven by said crank pulley means, and moves in the left and right direction in a definite stroke, a sub-lever which is adapted to move in the left and



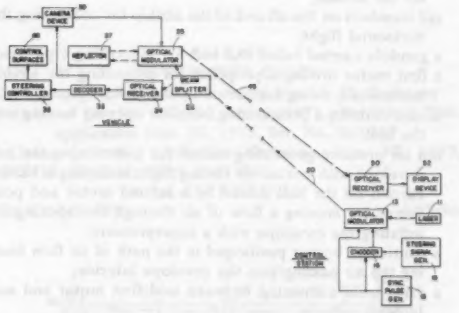
right direction with said main lever when said take-up reel disk means is rotating and stops regardless of the movement of said main lever when said take-up reel disk means is not rotating, and a control lever pivotally mounted on said main lever, said control lever moving with the movement of said main lever when said sub-lever stops.

4,018,405

VEHICLE GUIDANCE CONTROL LINK UTILIZING LIGHT BEAM

William Gene Baker, Rolling Hills Estates, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 18, 1974, Ser. No. 516,082
Int. Cl.³ F41G *7/00*, *9/00*; F42B *15/02*
U.S. Cl. 244—3.14 **8 Claims**



1. A vehicle guidance control link for controlling the steering of a vehicle from a remotely located control station comprising:

means at the control station for generating a laser beam,

means for generating control signals for steering said vehicle, said last mentioned means including a manually operable control,

means for modulating said beam with said control signals, said beam being directed towards said vehicle,

means on the vehicle for receiving said beam and including means for splitting the beam into first and second portions,

means for demodulating the control signals from said second beam portion,

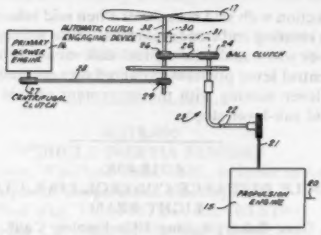
means responsive to said control signals for steering the vehicle,

means for generating a video signal indicating objects in the path of the vehicle,
means for modulating the first beam portion with said last mentioned signal,
means for reflecting the first beam portion back to said control station,
means at said control station for receiving said reflected beam and including means for demodulating said video signal therefrom, and
display means for providing a visual display of said video signal,
whereby an operator by observing said display is enabled to manipulate said manually operable control to determine said control signals.

4,018,406
REDUNDANT BLOWER DRIVE FOR PRESSURIZED HOT AIR AIRSHIP

Roger R. Parsons, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed Apr. 12, 1976, Ser. No. 676,246
Int. Cl.² B64B 1/58
U.S. Cl. 244—98 **8 Claims**



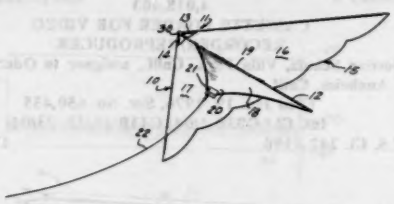
1. A thermal airship comprising in combination:
an elongate gas envelope of soft flexible material being aerodynamic shaped for horizontal flight providing a hull for the airship;
tail members on the aft end of the airship for controlling the horizontal flight;
a gondola carried below the hull for supporting a payload;
a first motor driving a propeller for propelling the airship horizontally being supported by the hull;
means defining a pressurizing inflation opening leading into the hull;
hot air pressure generating means for pressurizing the soft envelope with heated air during flight including a blower carried on the hull driven by a second motor and positioned for moving a flow of air through the opening for inflating the envelope with a superpressure;
a controlled burner positioned in the path of air flow heating the air passing into the envelope interior;
a drive train connected between said first motor and said blower;
and drive train clutch means in said drive train for connecting the blower to be driven by the first motor in the event of failure of the second motor whereby the airship will remain pressurized.

4,018,407
KITE

Arthur B. Aber, Montreal West, Canada, assignor to Stanbel, Incorporated

Filed Dec. 29, 1975, Ser. No. 644,962
Int. Cl.² B64C 31/06
U.S. Cl. 244—153 R **3 Claims**

1. A keel kite adapted for flying in any of various wind-strength conditions from a string, said kite comprising:
a central, hollow, tubular frame member lying in a longitudinal, central, vertical plane of said kite;
second and third hollow, tubular frame members lying in a plane transferse to said central vertical plane and detachably joined to said central frame member at a nose piece of said kite;
said nose piece comprising integral first, second, and third lugs each removeably receiveable snugly within an end of a respective one of said frame members for orientation thereof in said central and transverse planes, the second and third lugs forming the same angle to the central plane on either side thereof;
a flexible lifting surface attached to and extending among said frame members;
a flexible keel attached to said central frame member in said central plane;



a string attachment plate affixed to a lowermost portion of said keel opposite the central frame members, the plate comprising a reinforcing material and forming at least three apertures therethrough; and
the apertures being aligned parallel to the central frame member and spaced apart within a distance of about 2 inches (5 centimeters),
whereby said frame members are maintained in their relative planes at said nose piece, and whereby placing said string selectively in a forwardmost one of said apertures decreases the angle of attack of the kite to decrease lift and improve performance in high-speed winds and placing the string in a rearwardmost one of said apertures increases the angle of attack of the kite to increase lift and improve performance in low-speed wind conditions.

4,018,408
CONCAVE PARABOLIC ARCH KITE

Peter J. Pearce, and Toby J. Cowan, both of Studio City, Calif., assignors to Synestructics, Inc., Chatsworth, Calif.

Filed July 15, 1975, Ser. No. 596,015
Int. Cl.² B64C 31/06
U.S. Cl. 244—153 R **11 Claims**

1. A kite comprising:
at least two sails formed from rectangular sheets disposed about sections of the surface of an imaginary right parabolic arch which extends in forward and aft directions so that a first pair of edges of each sail are parallel to the axis of the arch and colinear and a second pair of edges, forward and aft, of each sail are curved and lie in parallel

planes, said sails being separated from each other axially; and,

a substantially rectangular frame having a pair of opposite sides to each of which the colinear edges of each sail are secured, the opposite sides extending in the aft direction beyond the end of the rectangle.

4,018,409

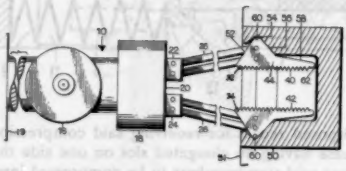
COMBINED DOCKING AND GRASPING DEVICE

John L. Burch, Decatur, and James D. Johnston, Madison, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 7, 1975, Ser. No. 602,617

Int. Cl.² B64G *1/00*

U.S. Cl. 244—161 **11 Claims**



1. A combined docking and grasping device for use with a manipulator arm on a docking vehicle for mechanically connecting together the docking vehicle with a docking payload having a receptacle for receiving said device therein, said manipulator arm including a mechanical wrist joint having a pair of rotatable axes providing said arm with movement about two perpendicular axes, said device comprising:

a. a pair of jaw members movable towards each other and away from each other to a spread apart configuration;

b. an elongated linkage assembly connecting each of said jaw members to said wrist joint;

c. means carried adjacent said wrist joint for moving said elongated assembly causing said jaw members to move towards and away from each other;

d. each of said jaw members having an interface surface enabling said jaw members to grip an object securely between said surfaces; and

e. a cam portion formed on an upper surface of each of said jaw members for engaging a receiving portion formed within said receptacle when said jaw members are in a spread apart condition to interlock said docking vehicle and docking payload together;

whereby said manipulator arm may be selectively utilized either as a docking device or as a general purpose grasping device to pick up an object.

4,018,410

METHOD FOR THE OPTIMIZED TRANSPORTATION OF PASSENGERS OR OBJECTS

Charley Renaux, Jouques, France, assignor to Halberthal S.A., Terville, France

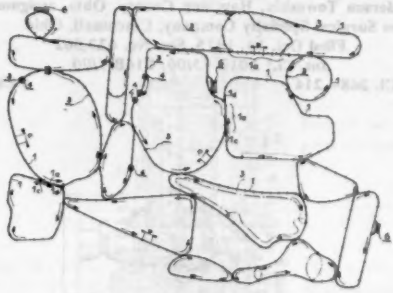
Filed Dec. 30, 1974, Ser. No. 537,461

Claims priority, application France, Jan. 11, 1974, 74.01066

Int. Cl.² B61L *27/04*

U.S. Cl. 246—5 **1 Claim**

1. A method of transporting objects from plural starting points to plural final destinations in a continuous manner and always in the same directions, said method comprising the steps of providing a network of routes including several one-way closed circuit routes, arranging said routes to have convergent and divergent stretches and common zones between said stretches, providing a plurality of vehicles for movement along said routes, providing guide-marking elements and traversing each route in a one-way sense and in a continuous movement, arranging said guide-marking elements in each common zone at controlled spacing designated as pitch P and moving said guide-marking elements at a controlled speed V, keying said guide-marking elements to said vehicles by a servo system during the movement thereof over said routes, providing said vehicles with means permitting changing of said guide-marking elements, shifting said guide-marking elements in said common zones from one route to another and utilizing said guide-marking elements as pilots for said vehicles, providing said routes with counter means fixed at an exit from each of said divergent stretches for detecting positions of vehicles with respect to said guide-marking elements and controlling



said servo system for resetting the keying of said vehicles on said guide-marking elements, providing said routes with fixed signal means for executing at selected moments orders to change routes of said guide-marking elements, providing said routes with means for executing rekeying of vehicles with said guide-marking elements upon command from said counter means, calculating the number of vehicles anticipated per section of said routes for each selected unit of time, prior to the departure of each vehicle from its starting point fixing the itinerary of said vehicle in accordance with the anticipated congestion of vehicles, and utilizing said counter means and said fixed signal means to follow said fixed itinerary.

4,018,411

POWER FEED CHAIN

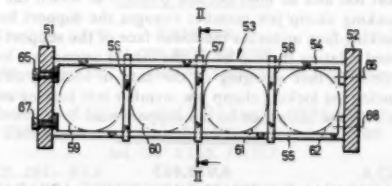
Kurt Hennig, Georgensteinstr. 16, 8 Munich 71, Germany

Division of Ser. No. 422,206, Dec. 6, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 563,589

Claims priority, application Germany, Dec. 19, 1972, 2262018; Sept. 20, 1973, 2347383

Int. Cl.² F16L *3/16*

U.S. Cl. 248—49 **1 Claim**



1. A strut for connecting two chain bands of a power feed chain, wherein the improvement comprises a lightweight structure which is a rigid bridge and therefore resists twisting so as to hold the two chain bands parallel to one another, said rigid bridge being in the form of a rigid grid comprising two cross-ties consisting of strips of flat material arranged in parallel planes, and a plurality of spacers, each consisting of a strip of flat material, arranged in parallel planes that are perpendicular to the planes of the cross-ties, each of said spacers having

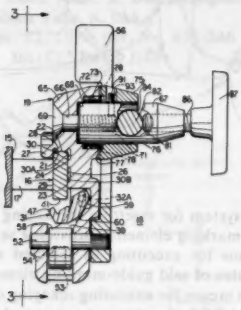
two notches to receive the two cross-ties, said notches being formed in opposite sides of the strip and being located adjacent to opposite ends of the strip, and each notch having a depth substantially equal to the width of the cross-tie which is received in the notch, and having parallel sides which fit against the sides of the cross-tie to prevent pivoting of the spacer relative to the cross-tie, thus forming said rigid bridge connecting the chain bands.

4,018,412

BRACKET FOR AN OPERATING TABLE

George Kees, Jr., Alexandria, Ky., and Horst R. Hickmann, Anderson Township, Hamilton County, Ohio, assignors to Kees Surgical Specialty Company, Cincinnati, Ohio

Filed Oct. 14, 1975, Ser. No. 622,362
Int. Cl.² A01B *15/00*; F16B *1/00*
U.S. Cl. 248—214 **4 Claims**



1. An instrument support bracket for an operating table which comprises a body having a downwardly directed support face for overlying an upper face of a support bar of the operating table, an upright face for engaging an upright outer face of the support bar, and a lip for engaging an inner upright face of the support bar, a locking clamp jaw member, said locking clamp jaw member having a locking face engageable with an underside of the support bar, a lip engageable with the inner upright face, and pivot pin means spaced from the lip and from the locking face, upright slot means in the body for guiding the pivot pin means for up and down movement, a cam pivotally mounted in the body under the locking clamp jaw member and engageable with the locking clamp jaw member, in the plane of the slot means being at right angles to the pivotal axis of the cam, and means for swinging the cam, the cam being arranged to swing the locking clamp jaw member between a lowered position in which the lip is free of the support bar and an intermediate position in which the lip of the locking clamp jaw member engages the support bar and the locking face underlies the lower face of the support bar in opposed relation thereto when the cam is swung in a locking direction, further swinging of the cam in locking direction advancing the locking clamp jaw member into locking engagement with the underside of the support bar.

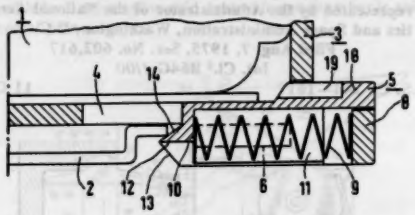
4,018,413

ELECTRICAL EQUIPMENT MOUNTING APPARATUS INCLUDING A MOVABLE MOUNTING MEMBER

Johann Bauer, Amberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 488,838, July 15, 1974, abandoned. This application Aug. 6, 1975, Ser. No. 602,469
Int. Cl.² E04G *3/00*; H01R *9/00*
U.S. Cl. 248—214 **2 Claims**

1. In an electrical equipment apparatus including an equipment housing (1) and at least one slidable mounting member (5) for fastening the electrical equipment to a support rail (2), said mounting member being guided by guide keys (6) provided in said equipment housing and including a compression spring (9) having one end thereof disposed in engagement with said mounting member and the other end thereof in engagement with said equipment housing, the improvement comprising means for limiting the movement of said mounting member in said equipment housing when said equipment is removed from said rail including a pair of barb-like, resilient stop members (16) formed on said mounting member and extending transversely with respect to the direction of movement thereof, said mounting member including a longitudinally disposed recess for receiving said compression spring, said recess having an elongated slot on one side thereof for permitting said stop members to be compressed inwardly for inserting and removing said mounting member into and from said equipment housing, and said equipment housing including recesses provided therein for receiving said stop members and starting surfaces (21) inclined inwardly toward the sides of said mounting member for guiding said stop members into said recesses, said stop members cooperating with said recesses for limiting the movement of said mounting member in said equipment housing.

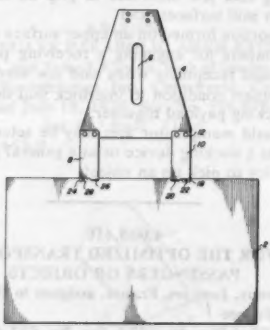


4,018,414

HOLDING FIXTURE

Everett Arthur Rote, Corona, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 7, 1975, Ser. No. 602,701
Int. Cl.² B42F *13/00*
U.S. Cl. 248—317 **3 Claims**



1. A board holding fixture comprising:
a. a supporting member
b. said supporting member having a first and second extension connected thereto,
c. each of said first and second extensions having a transverse groove therein to form a pair of flanges,
d. a notch cut into one of the flanges formed by said transverse groove on each extension to form a lip,
e. a notch cut into the other of said flanges on each extension to form a second lip,
f. each of said lips being horizontally displaced relative to the other,

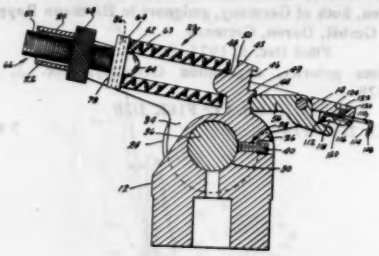
g. a pin mounted on one of said lips on each extension onto which pins the board is mounted.

4,018,415

MECHANISM FOR TILTING CHAIRS

Richard H. Wolters, Grand Rapids, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Jan. 13, 1976, Ser. No. 648,793
Int. Cl.² A45D *19/04*; F16M *13/00*
U.S. Cl. 248—381 13 Claims



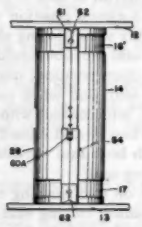
1. A chair tilting mechanism having a vertical spindle support and a tilt plate extending in a plane laterally from and at right angles to said spindle support and pivotally carried by said spindle support; stop means carried by said tilt plate and cooperating with said spindle support for limiting forward pivotal movement of said tilt plate relative to said spindle support, the improvement in said mechanism comprising: an encapsulated, coil spring operatively connected between said spindle support and said tilt plate and having its central axis generally parallel to and substantially in the plane of said tilt plate for providing a return torque opposing backward pivotal movement of said tilt plate.

4,018,416

RESILIENT, DESTRUCTABLE CORE MEANS

Erhard Armin Diener, 643 Saskatchewan Crescent E., Saskatoon, Canada

Continuation-in-part of Ser. No. 440,589, Feb. 7, 1974, Pat. No. 3,921,953. This application Nov. 14, 1975, Ser. No. 631,881
Int. Cl.² B28B *7/30*, *7/34*
U.S. Cl. 249—62 6 Claims



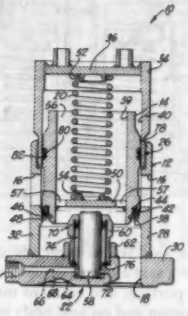
1. A vent forming device for walls and the like of concrete adapted to be embedded in the wall when same is poured between a pair of wall forms, comprising in combination a substantially cylindrical sleeve, a pair of cores of semi-rigid thermoplastic material one in each end of said sleeve being slidably engageable within said sleeve, wall form engaging end caps one on each outer end of said cores, means between said cores normally urging said cores apart from one another, flammable means extending through said cores which, when ignited, partially destroys said cores, and igniting means connected to said flammable means and extending from the outer end of at least one of said cores for igniting said flammable means.

4,018,417

VALVE AND SEAL ASSEMBLY THEREFOR

Herbert G. Hanson, Arlington Heights, Ill., assignor to Vapor Corporation, Chicago, Ill.

Continuation of Ser. No. 485,901, July 5, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,423
Int. Cl.² F16K *31/163*
U.S. Cl. 251—63.5 9 Claims



1. In an internal safety shutoff and operating valve including a housing defining a cylinder having fluid inlet and outlet means, a piston assembly movable in said cylinder comprising a generally cylindrical rigid body having a central axial opening extending throughout its length for balancing pressures acting on the piston assembly, a first groove adjacent an end of said body, valve closure means including a valve seal member mounted in said first groove, valve actuating means for operating said valve to control fluid flow through said inlet and outlet means, a circular cylindrical wall formed on the exterior of said body spaced from said first groove and sized to move with clearance in said cylinder, a seal retention groove extending around said cylindrical wall and having a generally rectangular shape with rounded interior corners, and a plastic seal ring in said groove for sealingly engaging said cylindrical wall, said seal ring including first and second grooves extending respectively around the inner and outer surfaces of said seal ring and passage means intercommunicating said first and second grooves, said seal ring of a configuration including corners substantially of a right angle whereby said seal corners interact with said rounded interior corners to provide a mechanical camming of said seal relative to said groove.

4,018,418

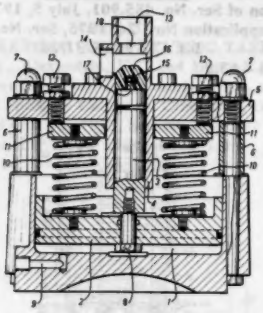
FLOW GOVERNOR

Guy Dion-Biro, 46 Avenue du Chateau, 94300 Vincennes, France

Continuation of Ser. No. 494,271, Aug. 2, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 662,208
Int. Cl.² F16K *31/363*
U.S. Cl. 251—63.6 3 Claims

1. A flow governor for regulating the inlet of gas from a high pressure liquified source, said governor comprising a body having a cylindrical bore, a piston slidable in said bore and having a lower face with an abutment and an upper face with a central rod thereon, said lower face of the piston defining with said body a control chamber, a bushing fixed to said body and having an axial bore in which said piston rod is slidable, said bushing including a coaxial top cap in which said bore extends, said top cap having a first orifice coaxial with said bore and forming an inlet for high pressure liquified gas from a source thereof, and a second orifice perpendicular to the

first orifice and to said bore for outlet of the gas for expansion thereof and supply of expanded gas to said control chamber, a plunger elastically mounted on said piston rod for free movement thereon and including a frusto-conically shaped end portion, said plunger being slidably displaceable in said bore and being self-centering when sliding in said cap, said cap including a wall with an aperture therein between said first



and second orifices, said frusto-conically shaped end portion of said plunger facing said aperture in said wall which serves as a seat for said end portion, and resilient means acting on said upper face of the piston and on said body to urge the piston in a direction to reduce the size of the control chamber, said resilient means including a plurality of adjustable springs distributed on said upper face of the piston.

4,018,419

MINIATURE SOLENOID VALVE

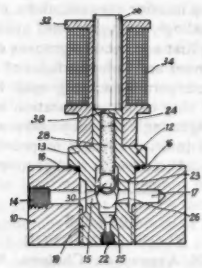
Louis Monpetit, Foncquevillers, France, assignor to Societe Anonyme D.B.A., Clichy, France

Filed Jan. 2, 1976, Ser. No. 646,221

Claims priority, application France, Jan. 6, 1975, 75.00210

Int. Cl.² F16K *31/08*

U.S. Cl. 251—65 **7 Claims**



1. A solenoid valve comprising a body assembly with a first and a second orifices, for controlling fluid communication in passage means defined between said first and second orifices, a valve seat being defined in said passage means, a valve member adapted to engage said valve seat thereby interrupting fluid communication between the first and the second orifices in response to predetermined operative conditions, said solenoid valve comprising coil means cooperating with a fixed core for changing magnetization of the latter in response to energization of the coil means, a magnetized rod to which said valve member is attached, said rod being slidably mounted in said body assembly, said magnetized rod being substantially coaxial with the core so that it is normally attracted toward the core when the coil means are not energized, and that it is pushed away from said core when the coil means are energized for urging said valve member against said valve seat, energization of the coil corresponding to said predetermined operative conditions.

4,018,420

SLIDE VALVE FOR CLOSING A LARGE PRESSURIZED GAS CONVEYING PIPE

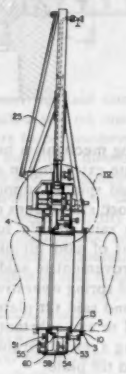
Rudolf Müller, Merzenich, and Hermann Josef Stolberg, Duren, both of Germany, assignors to Hermann Rappold & Co. GmbH, Duren, Germany

Filed Dec. 5, 1975, Ser. No. 638,094

Claims priority, application Germany, Dec. 5, 1974, 2457428

Int. Cl.² F16K *3/20*

U.S. Cl. 251—172 **7 Claims**



1. A slide valve for closing large gas pipes, particularly such pipes carrying dust-containing hot gases, said slide valve comprising:

a housing having an axial passage therethrough connectable to gas pipes, said housing having therein a housing opening;

a stationary sealing seat within said housing;

a movable sealing seat opposed to and axially spaced from said stationary sealing seat within said housing;

a slide plate mounted to be selectively movable from an open position exterior of said housing, through said housing opening to a closed position within said housing between said sealing seats closing said axial passage;

means for urging said movable sealing seat, when said slide plate is in said open position, into contact with said stationary sealing seat, and when said slide plate is in said closed position, into contact with said slide plate;

said slide plate, when in said closed position, being in sealing contact with both said movable sealing seat and said stationary sealing seat;

a closing element on said housing and selectively movable from a first position closing said housing opening when said slide plate is in said open position to a second position opening said housing opening when said slide plate is in said closed position; and

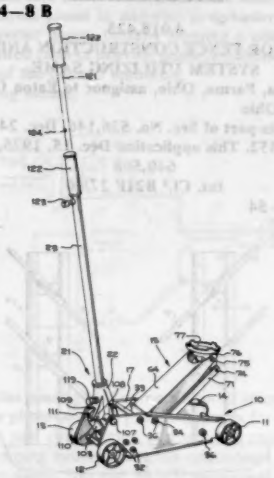
a chamber within said housing exterior of said passage, said chamber, when said slide plate is in said closed position, being sealed in a gas tight manner from the gas pipe and being open to the atmosphere through said housing opening such that any leakage from a pressurized section of the gas pipe will be vented to the atmosphere, and said chamber when said slide plate is in said open position, being closed by said closing element and thus forming a back-up seal to any leakage from the gas pipe.

4,018,421

PORTABLE LIFTING JACK

Erven Tallman, 15934 S. Figueroa, Gardena, Calif. 90247

Continuation of Ser. No. 540,121, Jan. 10, 1975, abandoned. This application June 3, 1976, Ser. No. 692,289
Int. Cl.[2] B66F 5/04
U.S. Cl. 254—8 B 15 Claims



1. A hydraulic lifting jack mechanism comprising a mobile frame of separate spaced horizontal parallel side plates each having inside and outside faces,

a set of wheels spanning said plates at each end of the frame,

transverse brace members connecting said plates,

an elevating linkage pivotally supported on said frame,

a hydraulic power unit on said frame and an operating handle assembly for said power unit,

said power unit comprising an integral multi-purpose block having a central transverse axis,

a reservoir in said block surrounding said transverse axis for hydraulic fluid,

said block having parallel side walls extending uniformly around said transverse axis,

circumferentially spaced anchoring elements adjacent the perimeter of each side wall of the block in positions spaced from said reservoir and anchored to the inside faces of respective said plates at a location intermediate said sets of wheels whereby the block serves simultaneously as a spacer,

a parallel alignment means and a connection for said plates,

said reservoir being located radially inwardly from said anchoring elements and extending transversely from one side wall to the other,

a vertical inside end wall and a hydraulic power cylinder mounted on said inside end wall and supported by said block in horizontal position and operably connected to said elevating linkage,

an outside end wall,

a pump cylinder member mounted on said outside end wall and supported by said block and a control stem having a valve element thereon mounted on said outside end wall,

a hydraulic fluid network in said block comprising a first bore in communication with said hydraulic power cylinder,

a second bore in communication with said pump cylinder member and connected with said first bore and a third bore having a valve seat therein in communication with said valve element and said stem and connected to said first bore,

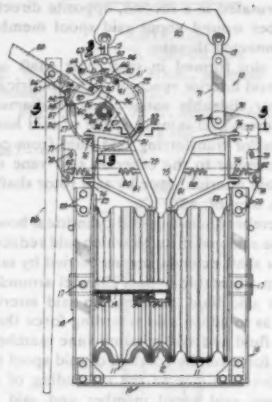
a supply passage between the reservoir and said second bore and a discharge passage between said third bore and said reservoir at a location downstream of said valve seat.

4,018,422

BUNDLE CONDUCTOR STRINGING BLOCK WITH ROTARY THREADING GATE

Hoyt W. Bozeman, Jr., Glendora, Calif., assignor to Lindsey Manufacturing Company, Azusa, Calif.

Filed Sept. 9, 1975, Ser. No. 611,679
Int. Cl.[2] B66D 1/36
U.S. Cl. 254—134.3 PA 36 Claims



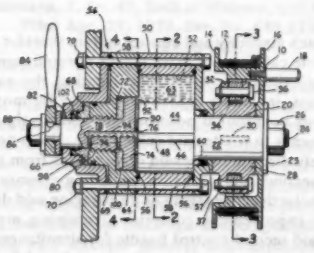
1. A bundle conductor stringing block of the type having a plurality of sheaves mounted on a shaft having its ends mounted in suspension frame means, said frame means including threading means for passing a hauling line for a running board laterally crosswise of said frame means and into the block throat from one exterior side of said frame means, said threading means including rotary gate means journalled on said frame means and having a slot opening through the periphery thereof to receive a hauling line and to transfer the same crosswise of said frame means as said gate means rotates through a partial revolution, and means operable by the entry of a hauling line into said slot to release said gate means and including spring means to rotate said gate means after release through a partial revolution thereby to transfer said line across said frame means and deposit the same onto a central one of said sheaves.

4,018,423

EMERGENCY DESCENT DEVICE

Robert R. Belew, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 16, 1975, Ser. No. 623,188
Int. Cl.[2] A62B 1/12; B66D 5/04
U.S. Cl. 254—158 7 Claims



1. A descent device for emergency descents and for lowering equipment from tall structures and the like comprising;

a cylindrical housing having an interior space containing a fluid;

a rotor shaft carried for rotation in said interior space having an end portion of reduced diameter extending through an opening in one end of said housing;

a spool member carried by said reduced end portion of said rotor shaft so as to rotate said rotor shaft when rotated in a first direction while being rotatable relative to said rotor shaft when rotated in a second, opposite direction;

a cable member wound about said spool member having one end connected thereto;

a diametrical slot formed in said rotor shaft carried for rotation in said interior space of said cylindrical housing;

a vane member slideably carried in said diametrical slot extending across said interior space of said housing;

channel means for transferring said fluid from one side of said vane member to the other as said vane member is rotated in said interior space by said rotor shaft to retard the rotation thereof; and

an end cap member enclosing said cylindrical housing on an end opposite said end through which said reduced portion of said rotor shaft extends, means carried by said end cap providing an adjustable bypass channel around said vane member for said fluid contained in said interior of said housing so as to adjust said retarding force thereagainst;

whereby said fluid and said rotating vane member produce a retarding force on the rotation of said spool member in said first direction due to the unwinding of said cable member from said spool member and said adjustable bypass means may be adjusted so as to control the speed of descent of said cable.

4,018,424

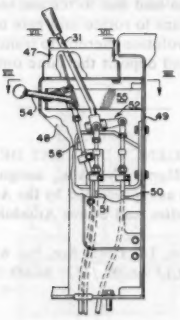
WINCH DISCONNECT CONTROL ARRANGEMENT

Robert M. Latimer, Canton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 11, 1975, Ser. No. 595,479

Int. Cl.² B66D 1/00

U.S. Cl. 254—187.1 **15 Claims**



1. In a winch assembly and control system therefor comprising a rotatable cable drum, drive means normally connectible to said cable drum for selectively rotating the same, first control means, including a first control handle movable between various operational positions, for selectively actuating said drive means to rotate said cable drum, disconnect means for selectively disconnecting said drive means from said cable drum, and second control means, including a second control handle, for selectively engaging or disengaging said disconnect means, the improvement comprising retaining means connected to said second control handle for simultaneous movement therewith for preventing actuation of said first control means when said second control means is actuated to disengage said disconnect means and for permitting actuation of said first control means when said second control means is actuated to engage said disconnect means, said retaining means further operational for automatically engaging and moving said first control handle upon movement of said second control handle only when said first control handle is in one of said operational positions.

4,018,425

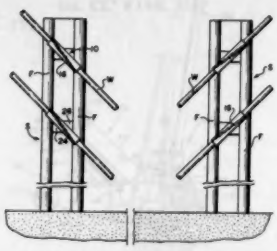
FASTENER FOR FENCE CONSTRUCTION AND FENCING SYSTEM UTILIZING SAME

John J. Sasena, Parma, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 536,146, Dec. 24, 1974, Pat. No. 3,959,852. This application Dec. 15, 1975, Ser. No. 640,508

Int. Cl.² B21F 27/00

U.S. Cl. 256—54 **16 Claims**



1. A one-piece spring fastener for mounting a wire to a channel-shaped support having inturned flanges to orient the wire at an oblique angle to the support, the wire having a maximum diameter and being mounted by said fastener for axial movement relative to the support, said fastener comprising;

a. a pair of spaced-apart, generally T-shaped wall portions;

b. a bight portion joining said T-shaped wall portions along substantially the entire length thereof and extending generally perpendicularly therebetween;

c. each of said T-shaped wall portions including a top portion contiguous with said bight portion, a generally dart-shaped wall portion, and an intermediate wall portion connecting said top portion and said dart-shaped wall portion;

d. said top portions being generally parallel and cooperating with said bight portion to define a trough for receiving the wire therein;

e. said dart-shaped wall portions being generally parallel and each of said dart-shaped wall portions defining a plane oriented at said oblique angle relative to its associated top portion; and

f. each of said dart-shaped wall portions being configured to be forcibly received therebetween the inturned flanges of the channel-shaped support and retained therebetween.

4,018,426

SYSTEM FOR PRODUCING EMULSIONS

Richard E. Mertz, and Kenneth J. Lissant, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Mar. 17, 1976, Ser. No. 667,754

Int. Cl.² B01F 7/00

U.S. Cl. 259—7 **9 Claims**

1. A system for producing at a selected rate a stable, highly viscous emulsion with an internal phase content of above about 75% by volume within an immiscible external phase comprising:

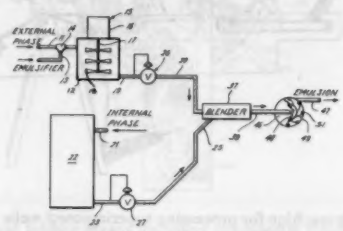
a. supply means providing individual stream of an inverter phase formed of an internal-in-external emulsifier and an external phase, and an internal phase;

b. first and second flow rate controller means for precisely

regulating in said supply means the flow rates of separate streams of the internal phase and the inverter phase in a preselected ratio in the range of between 95 to 5, and 75 to 25 percents by volume within said system;

c. mixing means receiving the separate streams of the internal phase and the inverter phase and distributing loosely the internal phase in stepwise progressive amounts into the inverter phase, thereby forming a composition with the desired ratio of internal phase, emulsifier and external phase of the desired emulsion;

d. pumping means;



e. means for passing said composition of internal phase and inverter phase into said pumping means for moving therethrough said composition at a selected rate;

f. said pumping means providing continuous shear at rates between about 500 and 10,000 reciprocal seconds sufficient to reduce the effective viscosity of said composition near to that of the inverter phase but below the inherent shear stability point of the desired emulsion; said pumping means retaining less than 1% by volume of said emulsion relative of the volume per minute of said composition being moved;

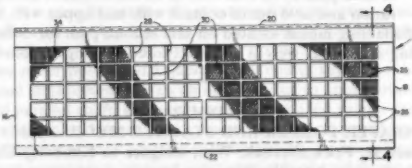
g. outlet means for removing the resultant emulsion from said pumping means to a subsequent utilization.

4,018,427

ELECTROPLATING BARREL SIDEWALL CONSTRUCTION

Alfred N. Marulli, Bristol, Conn., assignor to National Plastics & Plating Supply Co., Inc., Terryville, Conn.

Filed Jan. 23, 1975, Ser. No. 543,641
Int. Cl.[2] C25D *17/22*; **B01F** *9/00*
U.S. Cl. 259—81 R **4 Claims**



1. An electroplating barrel comprising a plurality of rectangular panels, and end plates for supporting the panels so that said panels define a generally polygon shaped sidewall for the barrel, each of said panels including:

a. an outer grid portion having longitudinally extending ribs and intersecting cross ribs defining relatively large size rectangular openings therebetween, all of said ribs having a thickness (*t*) and being molded from a chemically inert plastic material,

b. an inner portion of said panel having a generally flat sheet of said chemically inert material which sheet is integrally attached to the inside edges of said ribs in said outer grid portion, said sheet having at least approximately the same thickness (*t*) as that of said ribs, and

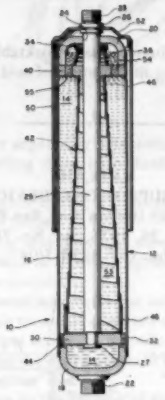
c. said inner panel portion further including longitudinally extending load breaker bars formed from said chemically inert plastic material and integrally attached to the inside surface of said sheet, said breaker bars having a height approximately equal to said thickness (*t*) and said bars being so arranged as to form an inwardly projecting extension of each of said longitudinally extending ribs in said outer grid portion.

4,018,428

SHOCK ABSORBER

Thomas J. Weir, Jackson, Mich., assignor to Hayes-Albion Corporation, Jackson, Mich.

Filed July 30, 1975, Ser. No. 600,415
Int. Cl.[2] F16F *5/00*
U.S. Cl. 267—65 R **9 Claims**



1. An automotive shock absorber assembly comprising an elongated housing containing a viscous liquid, a shaft extending axially into said housing, alignment means disposed within said housing and connected to one end of said shaft, and a volute spring forming a chamber within said liquid, said spring cooperating with said alignment means and adapted to compress or extend in the contained liquid when said shaft is subjected to an axial load, said volute spring also having its ends secured within said housing in substantially sealed relation to necessitate liquid flow through adjacent turns of said spring upon compression or extension thereof, thereby producing viscous shear as the predominant energy absorption means of the assembly.

4,018,429

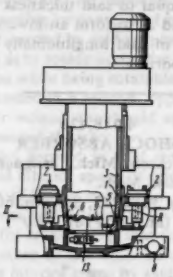
VERTICAL MULTIPLE-SPINDLE MACHINE

Jury Pavlovich Alafuzov, Bolshaya Cheremushkinskaya, 18, korpus 1, kv. 24, and Artur Markovich Itin, Rostovskaya naberezhnaya, 1, kv. 47, both of Moscow, U.S.S.R.

Filed Apr. 29, 1976, Ser. No. 681,523
Int. Cl.[2] B23Q *3/08*
U.S. Cl. 269—20 **1 Claim**

1. A vertical multiple-spindle machine comprising: a rotary worktable provided with a centre hole; hydraulic clamping devices mounted on said worktable; a stationary column having a taper portion on which said worktable is mounted by the use of the centre hole provided therein; a circular groove provided on the taper portion of said column and arranged to communicate with a fluid source; fluid ducts provided in said worktable for fluid to be force-fed to said hydraulic clamping devices via said circular groove; interconnected passaged provided in said column and arranged to communicate with said fluid source, each of said passages having an outlet located on the surface of the taper portion of said column in such a manner that when the worktable is in a fixed position

each of its ducts connects with one of the passages; said circular groove has portions curved about said outlets from said



passages whereby it connects said worktable fluid ducts with the fluid source during the rotation of said worktable.

4,018,430

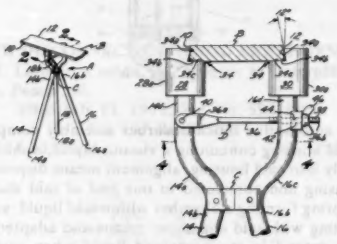
SKI SUPPORTING DEVICE

Michael J. Ursich, 1309 Dodson Ave., San Pedro, Calif. 90732

Filed July 26, 1976, Ser. No. 708,885

Int. Cl.² B25B *5/04*

U.S. Cl. 269—156 **7 Claims**



1. A pair of portable supports for removably engaging longitudinally spaced sections of a ski that has first and second laterally spaced side surfaces to dispose the latter in an elevated substantially horizontal position above a floor surface to permit the ski to be tuned or maintenance work performed thereon, each of said supports including:

a. first, second and third elongate rigid spaced legs that each have first upwardly disposed ends and second ends that rest on a floor surface, first, second and third leg extensions that project upwardly and outwardly from said first ends of said first, second and third legs, and said first, second and third leg extensions including first, second and third straight vertically disposable end portions;

b. first means for pivotally connecting said first, second and third ends of said first, second and third legs in such a manner that said second and third end portions may be disposed in a common vertical plane and said first end portion moved normal to said vertical plane;

c. first, second and third clamps pivotally supported on said first, second and third end portions; and

d. second, manually operated means for pivoting said first leg from a first to a second position relative to said second and third legs to force said first clamp into pressure contact with said first side edge surface and said second and third clamps into pressure contact with said second side edge surfaces to frictionally grip a longitudinal section of said ski therebetween, with said second means when in said second position so remaining until manually moved to said first position.

4,018,431

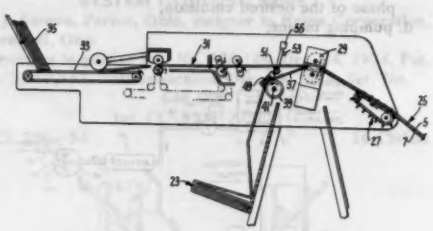
SEPARATOR FOR HANDLING MULTI-FOLDED PAPER

Marlin Alios Schueler, San Leandro, Calif., assignor to American/Durein Company, Oakland, Calif.

Continuation-in-part of Ser. No. 514,008, Oct. 11, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,531

Int. Cl.² B65H *41/00*

U.S. Cl. 270—52.5 **8 Claims**



1. In a machine for processing superimposed webs of paper, said superimposed web consisting of at least an upper web and a lower web, comprising in combination:

a. driving means for introducing said superimposed web into said machine at a speed so that said upper web follows a first linear path,

b. separating means for separating said upper web from said lower web and propelling the lower web along a second path which is located beneath said first path, said means including:

1. roller means for receiving said lower web, said roller means including a roller mounted below said first path, said roller having an outer surface positioned to contact the under surface of said lower web and extending for substantially the entire width of web, said outer surface being covered by granules to form a rough surface,

2. means for rotationally driving said roller at a surface speed slightly greater than the speed of the introduced superimposed web,

3. web engaging means located between said first path and said roller to engage the upper surface of said lower web and press same downwardly into contact with said roughened roller substantially across the entire width of said lower web such that said lower web is driven in a positive manner by said roller along said second path to be collected in an intact folded configuration and held out of contact with said upper web; and

c. collecting means located on said second path for collecting said lower web in an intact folded configuration.

4,018,432

DIAPER FOLDER AND STACKER MECHANISM

Richard H. Frick, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

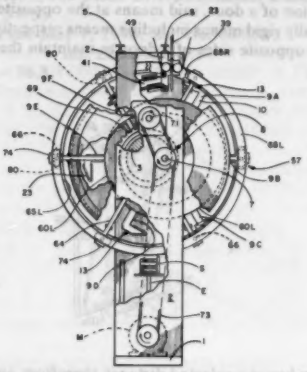
Filed Nov. 20, 1975, Ser. No. 633,923

Int. Cl.² B65H *45/18*

U.S. Cl. 270—61 R **3 Claims**

1. In combination, in diaper folding mechanism adapted to receive a diaper in essentially planar shape and to fold it, diaper feed means for feeding a diaper downwardly in a vertical plane, a folding board arranged to move in a closed curved path and to intercept a diaper in said vertical plane along a fold line disposed approximately centrally of the diaper, said folding board having needle means carried on the folding board to engage and penetrate a said diaper as the diaper is contacted by the folding board, and means for folding the diaper about opposed surfaces of the folding board while the diaper is retained by the needle means and folding board, said folding means including opposed members forming a slot in the said path of the folding board through which the folding

board moves, said members positioned for contacting and smoothing a diaper on the opposed surfaces of said folding



board, said folding means including cooperable means operable in the movement of the board through the slot to tuck portions of the diaper inwardly of itself.

4,018,433

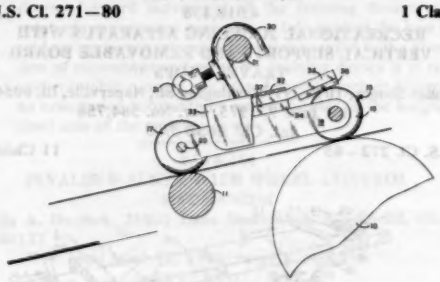
SHEET MATERIAL TRANSPORTING MACHINE

Kenneth D. Woods, P.O. Box 141, Spring Valley, Calif. 92077

Filed Aug. 8, 1975, Ser. No. 603,096

Int. Cl.² B65H *29/20*

U.S. Cl. 271—80 **1 Claim**



1. An attachment for sheet material transporting machines of the type having a power driven drum, a rotatable shaft in spaced relation to said drum and axially parallel thereto, an idler roller positioned adjacent each end of said drum in frictional engagement therewith and adapted to cause rotation of said parallel shaft, an ejection roller in spaced axially paralled relation to said drum, and a frame member disposed paralled to said drum, said attachment comprising: a pair of parallel frame members in spaced relation, each of said frame members being formed with an aperture at each end thereof; a guide roller disposed between each end of said frame member and formed with an axial bore for axial registry with the apertures of said frame members, one end of each said frame member and one of said guide rollers being in axial allignment to receive said rotatable shaft therethrough whereby said guide roller is laterally positionable on said shaft and is adapted to bear against sheet material being transported therethrough, said second guide roller being formed with an axial bore for rotatable disposition between the other ends of said frame members and adapted to bear against the said ejector roller; and a U-shaped mounting member having means for securing said attachment to said frame member in laterally adjustable relation and including a pair of downwardly extending side members adapted to frictionally engage and support said frame members therebetween.

4,018,434

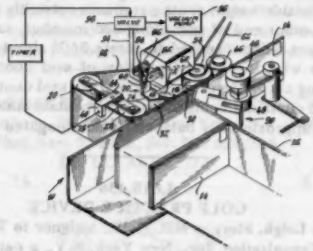
PNEUMATIC FEED DEVICE

Thomas J. Mitchell, Darien, and Leonard M. Pengue, Huntington, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Apr. 12, 1976, Ser. No. 675,907

Int. Cl.² B65H *3/12*

U.S. Cl. 271—96 **19 Claims**



1. Apparatus for separating substantially flat articles from a stack and for feeding them individually to another position comprising:

a conveyor member having a number of perforations along a fixed length thereof,

means for driving said conveyor member,

a carrier for a stack of articles disposed adjacent one side of said conveyor member,

vacuum shoe means adapted to be connected to a source of vacuum having an outlet disposed adjacent the other side of said conveyor member opposite to said carrier,

means for sensing the perforations in the fixed length of said conveyor member, and

means responsive to the sensing of the perforations on said conveyor member by said sensing means for connecting said vacuum shoe means to said vacuum source for a predetermined time interval.

4,018,435

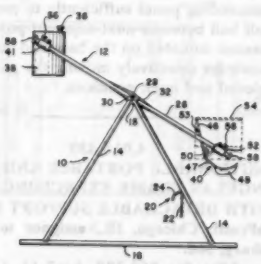
PLAYGROUND APPARATUS

George C. Howell, P.O. Box 96, Wilder, Idaho 83676

Filed June 13, 1975, Ser. No. 586,594

Int. Cl.² A63G *1/14*

U.S. Cl. 272—33 R **10 Claims**



1. A playground apparatus comprising:

a. support means for placement on a substantially flat surface, including two vertical support frames, said support means providing a stable base for said apparatus;

b. an elongated member rotatably suspended between said vertical support frames allowing 360° rotation of said elongated member about a horizontal axis at the approximate midpoint of said member;

c. means for supporting occupant in an upright position on one end of said elongated member during said 360° rota-

tion, said occupant supporting means comprising a seat support shaft suspended on said elongated member with a generally vertical seat support member affixed to said seat support shaft, said seat support member including a substantially horizontal seat mount having a saddle-type seat affixed thereto, said occupant supporting means allowing said occupant to propel said elongated member about said horizontal axis by pushing against said surface with the occupant's legs; and

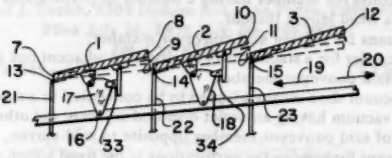
d. a variable weight container means rotatably suspended at the other end of said elongated member, said container means being disposed to rotate 360° about a horizontal axis with the axis of rotation of said container means being above the center of gravity of said container means, said container being disposed to contain materials therein for approximately balancing said elongated member.

4,018,436

GOLF PRACTICE DEVICE

John U. Leigh, Morgan Hill, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 26, 1976, Ser. No. 680,284
Int. Cl.² A63B *69/36*
U.S. Cl. 273—35 B **3 Claims**



1. A golf practice device, comprising

a simulated green comprising a plurality of panels positioned in substantially coplanar relation next-adjacent each other to form a substantially continuous surface inclined at a predetermined angle with a horizontal base, each of the panels having spaced opposite substantially parallel first and second edges;

mounting means pivotally mounting each of the panels on the base at the first edge of each of the panels whereby each panel is pivotally movable about its first edge from a closed position in which it is substantially coplanar with the other panels to an open position in which its second edge is raised above and spaced from the first edge of the next-succeeding panel sufficiently to permit the passage of a golf ball between next-adjacent panels; and

control means mounted on the base and coupled to each of the panels for selectively moving the panels in unison to their closed and open positions.

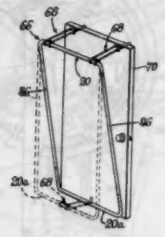
4,018,437

MULTIPOSITIONABLE PORTABLE AND COLLAPSIBLE RECTANGULAR FRAME EXERCISING APPARATUS WITH DETACHABLE SUPPORT MEANS

Roy F. LoPresti, Chicago, Ill., assignor to Samuel Peskin, Gaithersburg, Md.

Division of Ser. No. 567,370, April 11, 1975, Pat. No. 3,944,219. This application Nov. 3, 1975, Ser. No. 627,855
Int. Cl.² A63B *1/00*
U.S. Cl. 272—62 **6 Claims**

1. A door-stablized, floor supported horizontal bar exercising apparatus comprising a closed rectangular frame having approximately the dimensions of a door and consisting of spaced vertical tubular side members and spaced horizontal top and bottom tubular cross members, substantially rigid means for releasably attaching the frame to a door, said substantially rigid means comprising, at least one substantially rigid member having means at one end for detachably connecting the substantially rigid means to the top tubular cross member, and said substantially rigid means at its opposite end for detachably connecting it directly to the upper marginal edge portion of a door, said means at the opposite end of said substantially rigid means including means respectively engageable with opposite sides of a door to maintain the top tubular



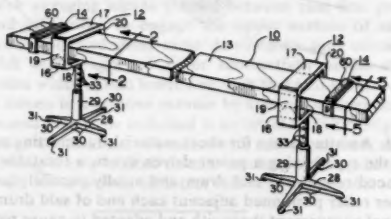
cross member at a selected distance therefrom and to prevent transverse movement of said cross member a relative to a door, while supporting said bottom tubular cross member on a floor adjacent a door, and to enable said top tubular cross member to be used for gymnastic exercising upon attachment of the frame to a door.

4,018,438

RECREATIONAL JOUNCING APPARATUS WITH VERTICAL SUPPORTS AND REMOVABLE BOARD TRAVEL STOPS

James Shoger, 10 S. 391 Washington St., Naperville, Ill. 60540

Filed June 9, 1975, Ser. No. 584,758
Int. Cl.² A63B *5/00*
U.S. Cl. 272—65 **11 Claims**



1. An assemblable jouncing apparatus comprising:

a jouncing board;

a pair of support means effective to loosely support said board above the ground, each engaging said board in supporting relation at selected distances from the ends thereof; each said support means including a supporting member having a configuration defining supporting surfaces upon which said board longitudinally moves during downward deflection thereof;

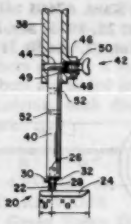
said support means including a support member having an arcuate board engaging surface so that the downward vertical component of force transmitted by said board to each said support member during said deflection are substantially larger than horizontal component of same force; and

removable board retaining means selectively disposed and positionable on said board at locations adjacent the board support means to retain said board in supporting relation between said support means while users are jouncing.

4,018,439
TRAINING DEVICE FOR ICE SKATERS

Reinhold J. Kauk, 442 Biehn Drive, Kitchener, Ontario, Canada (N2G 3W5)

Filed May 7, 1976, Ser. No. 684,381
Int. Cl.² A63C 3/04
U.S. Cl. 272—70.3 6 Claims

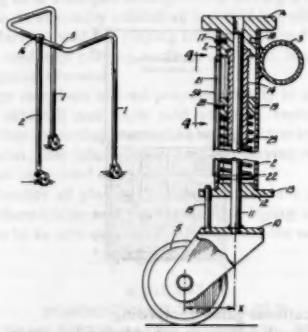


1. A training device for ice skaters comprising:
a rectilinear horizontally disposed frame dimensioned to enclose a skater;
a pair of front support legs and a pair of rear support legs extending downwardly from the corners of said frame;
a runner secured to each of said support legs, the runners on at least said pair of rear support legs being rotatably mounted theron so as to be rotatable through a predetermined arc;
and spring means operatively connecting each of the rotatable runners with their associated support legs, whereby during forward movement of the training device said rotatable runners are caused to rotate against the bias of said spring means into an orientation parallel to the direction of movement and when the training device is at rest said rotatable runners are biased by said springs towards an orientation substantially perpendicular to the longitudinal axis of the training device.

4,018,440
INVALID WALKER WITH WHEEL CONTROL MECHANISM

Fritz A. Deutsch, 25801 Lake Shore, Apt. 87, Euclid, Ohio 44132

Filed Mar. 31, 1975, Ser. No. 563,615
Int. Cl.² A61G 13/00
U.S. Cl. 272—70.3 3 Claims



1. A walker device, comprising, a frame having a plurality of support points, roller means for providing full mobility of the device, releasable lock means on said roller means, lock release means operatively associated with said lock means,
means initiated by a user and thereafter independent of operator control for actuating said lock means and said lock release means through a cycle which includes a lock release and subsequent reengagement of the lock whereby the user is free from control judgement over the distance the walker will advance after lock release;
said roller means being a wheel with a drum carried thereby, said lock means being a series of aligned holes spaced circumferentially around said drum, and a retractable lock pin insertable in any aligned hole in said drum,
said drum having a plurality of laterally spaced circumferential paths of holes therealong, each path having a different number of holes, and means to selectively and manually position said pin in alignment with one of said paths, whereby a lock cycle will release the wheel for advance a distance represented by the circumference of the wheel divided by the number of said holes in the selected path.

4,018,441
JUMP-ROPE TRAINING EXERCISE DEVICE

Howard Greenberg, 97 Allen St., New York, N.Y. 10002

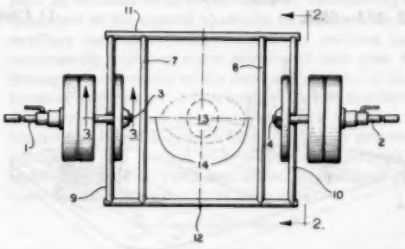
Filed Nov. 7, 1975, Ser. No. 629,705
Int. Cl.² A63B 5/22
U.S. Cl. 272—75 6 Claims

1. Jump-rope Training-Exercise Device, which comprises, in combination:
a jump-rope;
a pair of hand-protective elements, each adapted substantially to envelop and encompass one hand of the user; and
means for releasably connecting one end of said jump-rope to each of said pair of hand-protective elements.

4,018,442
SAFETY FRAME FOR WEIGHT LIFTING

William J. Galler, c/o Henry Pillard, Diamond K Lane, Joliet, Ill. 60433

Filed June 23, 1975, Ser. No. 589,437
Int. Cl.² A63B 13/00
U.S. Cl. 272—123 3 Claims



1. A safety device for use in weightlifting exercise wherein the user squats and rises to lift weights with both hands, said device comprising the following characteristics simultaneously:
a. a rigid, free standing, quadrilaterally symmetrical frame,
b. said frame defining an open space of sufficient size so that the user's body can be positioned in it without interferring ring with the frame, and without any part of the frame being above any part of the user's body at any time during the squat exercise,
c. said frame is rectangular in configuration and includes front and rear bar elements extending parallel to said parafrontal plane and at least one straight left side bar

element and at least one straight right side bar element extending perpindicular to said parafrontal plane and interconnecting said front and rear bar elements,

d. said frame having mounted horizontally thereon a left side weight attaching member and a right side weight attaching member, both for the purpose of attaching weights to the frame horizontally,

e. said left side weight attaching member and said right side weight attaching member are rigidly fixed to the respective midpoints of said left side bar element and said right side bar element,

f. said left and right side weight attaching member extend horizontally out on their respective sides, extending perpendicularly to the left and right side bar elements to which they are fixed,

g. said frame further having mounted thereon a left side handgripping member and a right side handgripping member with the midpoints of said handgripping members being closer to the user's body then the weight attaching members,

h. said left and right side weight attaching members, the midpoints of said left and right side handgripping members, the midpoints of said straight left and right side bar elements, and the center of gravity of said entire device lying in the parafrontal plane of the user's body when the user is standing fully erect holding the device down at his sides at arms's length,

i. when weights are attached to said left and right side weight attaching members, the center of gravity of each of the attached weights will lie in the parafrontal plane of the user's body when the user is standing fully erect holding the device down at his sides at arms's length,

j. the center of gravity of said entire device remaining in the same vertical plane as the center of gravity of the user's body during the squatting movement,

k. furthermore in the preferred form said left side handgripping member and right side handgripping member are located respectively at midpoints of an inner left side bar element and an inner right side bar element, said inner left and right side bar elements being closer to the user's body than said left and right side bar elements and extending parallel to said left and right side bar elements.

4,018,443

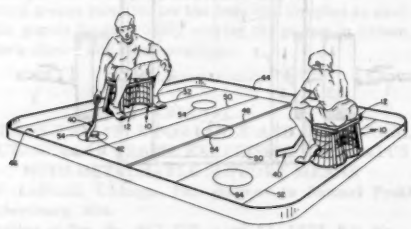
SIMULATED HOCKEY GAME GOAL UNITS

David M. Bird, 60 Disamar Rd., Taunton, Mass. 02780

Filed May 7, 1975, Ser. No. 575,150

Int. Cl.² A63F 7/06

U.S. Cl. 273—85 R **11 Claims**



1. A game apparatus comprising a goal unit in combination with a projectile of predetermined size, said goal unit being adapted for placement on a playing surface as a target for receiving said projectile of said predetermined size projected at said goal unit, said goal unit including a top, members extending from said top to said playing surface for supporting said top, and enclosure means disposed between said top and said playing surface, a continuously open gap in said enclosure means defining a goal mouth, said top being formed as a substantially flat-surface rigid unit for supporting the weight of a player and being spaced from said playing surface by a distance which permits a player to sit on said top with knees bent and feet on said playing surface.

4,018,444

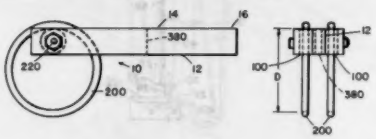
RING WHIRLING DEVICE

Otto F. Chew, Jr., Hillside Drive, and Louis W. Hinshaw, Box 111, both of Hays, Kans. 67601

Filed Sept. 25, 1975, Ser. No. 616,612

Int. Cl.² A63B 71/00

U.S. Cl. 273—109 **3 Claims**



3. A toy requiring skill in its operation comprising a frame, said frame having a handle having a forward end, at least two hubs on said frame, a plurality of rings disposed one on each of said hubs and each ring loosely receiving its respective hub therethrough whereby said rings can define motions about their respective hubs as will appear to be generally clockwise and counter-clockwise selectively as said rings are each viewed from a side thereof, said frame having skirt means thereon disposed in positions for preventing said rings from moving sidewise of themselves excessively toward respective sides of said frame for restraining said rings from coming off of said frame by movements sidewise of said rings and toward the outer side of said frame, and in which said hubs are each substantially of cylindrical shape on their exterior, and the cylindrical configurations of the exterior of said hubs being disposed in alignment for defining a hub axis, said handle extending substantially directly rearwardly from said axis.

4,018,445

EDUCATIONAL PUZZLE GAME

James A. Anania, Sr., 801 N. 6th St., No. 716, P.O. Box 186, Newark, N.J. 07107

Continuation-in-part of Ser. No. 577,233, May 14, 1975, Pat. No. 3,967,825. This application Sept. 26, 1975, Ser. No. 617,100

Int. Cl.² A63F 3/06

U.S. Cl. 273—135 B **10 Claims**

1. An educational game comprising:

a. a game board, said game board being divided by rows and columns of four in number and divided into sixteen spaces, said game board being disposed with container means comprising a hinged cover which folds over and covers said game board contained in the bottom portion of said container;

b. said game board having indicated thereon a numerical solution of 38,

c. said sixteen spaces of said game board being sequentially

numbered from one to sixteen and each of said spaces being adapted to receive numbered tokens thereon,

d. a total of sixteen numbered tokens, each of said tokens having affixed thereon a single number, said numbers being consecutive numbers from two to seventeen,

e. random selection means to select a numbered token,

f. means for causing said tokens to remain in the space selected on said game board;

wherein in playing the game, numbered tokens are selected by said random selection means and placed in each of said spaces of said game board in a manner whereby the numbers provide a numerical solution of 38 when the numbers are added in all 16 directions in each row, each column, each diagonal, or any four numbers in a square.

4,018,446

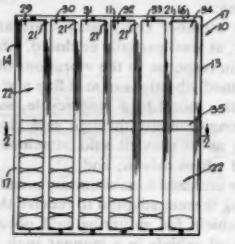
BOARD GAME

Thomas E. Keegan, 404 Green Valley Drive, Naperville, Ill. 60540

Filed Jan. 13, 1975, Ser. No. 540,406

Int. Cl.² A63F 3/00

U.S. Cl. 273—136 F **7 Claims**



1. A game board, which comprises:

a. a flat bottom base having a top planar playing surface;

b. a pair of upwardly extending sidewalls and end walls affixed to said base;

c. a plurality of strip members affixed perpendicularly to said top playing surface of said bottom base, each said strip member extending between said endwalls, said strip members evenly spaced between said sidewalls and forming a plurality of elongated tracks, each said strip member being of a T-shaped configuration having a top cross bar and a downwardly extending leg, said leg affixed perpendicularly to said top playing surface, one end of said cross bar, said top playing surface and said leg forming an elongated channel;

d. flange members affixed perpendicularly to a top of each said sidewall and each said endwall, each said flange member extending over said elongated tracks, said flange member, said sidewall, and said top playing surface forming an elongated channel; and

e. a plurality of playing members retained by said flange members within said channels, said playing members of a shape to be movable back and forth within said channels.

4,018,447

PHONOGRAPH TURNTABLE

Bruce H. Short, 3537 State Line, Kansas City, Mo. 64111

Filed Feb. 2, 1976, Ser. No. 654,613

Int. Cl.² G11B 15/00

U.S. Cl. 274—10 R **2 Claims**

1. A record selector comprising:

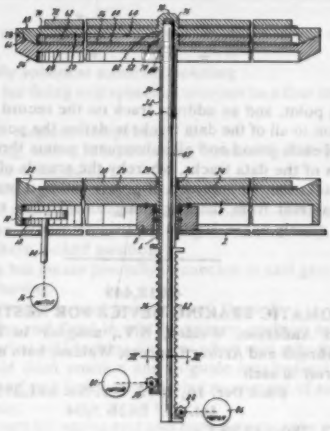
a. a generally circular horizontal main turntable rotatable about its vertical axis and adapted to carry a phonograph record concentrically thereon for playing,

b. drive means operable to rotate said main turntable,

c. a plurality of auxiliary turntables disposed above and concentrically with said main turntable, and each adapted to carry a phonograph record concentrically thereon,

d. means supporting said auxiliary turntables, and

e. operating means controlling said turntable supporting means to raise said auxiliary turntables to a spaced apart relation above said main turntable to admit the tone arm of the phonograph above the record carried by said main turntable, and to lower said auxiliary turntables successively, the first auxiliary turntable engaging said main turntable, but not the record carried by said main turntable, to be driven frictionally thereby to permit playing of the record carried by said first auxiliary turntable by said tone arm, the second auxiliary turntable engaging said first auxiliary turntable, but not the record carried thereby, to be driven frictionally thereby to permit playing of the record carried by said second auxiliary turnta-



ble by said tone arm, and so on, said turntable supporting means and said operating means comprising a vertical center post disposed concentrically with said turntables and cooperating with central apertures formed therefor in said turntables, said center post consisting of a plurality of concentrically telescoped sections, the diameter of the central aperture of the main turntable being sufficient to pass all sections of said post slidably therethrough, the diameters of the central apertures of successively higher auxiliary turntables being successively reduced to pass successively one less outer section of said post therethrough, the diameter of the central apertures of the two topmost auxiliary turntables being sufficient to admit only the central section of said post, the central aperture of the topmost auxiliary turntable being closed to prevent the passage of said central post section therethrough, and means operable to raise and lower the sections of said center post independently of each other.

4,018,448

RECORD FOR THE ARTIFICIAL REPRODUCTION OF SOUNDS

Paul Di Matteo, Dix Hills, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.

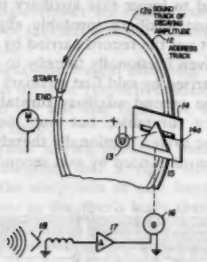
Division of Ser. No. 406,236, Oct. 15, 1973, Pat. No. 3,885,110, which is a continuation-in-part of Ser. No. 245,484, April 19, 1972, abandoned. This application May 14, 1975, Ser. No. 577,471

Int. Cl.² G10H 3/06

U.S. Cl. 274—42 R **2 Claims**

1. A rotatable record for storing recorded sounds for substantially instantaneous retrieval comprising record means

having a plurality of parallel spaced apart endless data tracks, each adapted to present itself continuously to pickup means in a recurring sequence with respect to a beginning point, and each track having means defining at least one sound recorded along its length, each recorded sound having a predetermined beginning point and a predetermined ending point, the amplitude of the sound decaying from the beginning point to the



ending point, and an address track on the record with means common to all of the data tracks to define the points of beginning of each sound and all subsequent points throughout the lengths of the data tracks, whereby the sounds of the respective tracks can be accessed at points within a predetermined time interval from the beginning to afford a reproduction which closely approximates the original sound.

4,018,449

AUTOMATIC BRAKING DEVICE FOR NESTING CART

Anders Anderson, Walden, N.Y., assignor to Patrick Suo, Maybrook and Arthur Concors, Walden, both of, N.Y., part interest to each

Filed Dec. 16, 1975, Ser. No. 641,295
Int. Cl.² B62B *5/04*
U.S. Cl. 280—33.99 C **9 Claims**

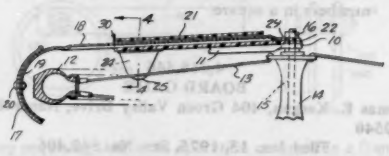
1. A wheeled cart having a handle with which to propel said cart; a normally locked wheel lock for at least one wheel of said cart; said wheel being mounted on an axle; said wheel lock comprising means for locking said wheel against forward motion comprising a first member having an edge bearing transversely against the periphery of said wheel, said first member being rotatably mounted on a pivot, said pivot extending in the same direction as the axle of said wheel and being positioned radially outward from the periphery of said wheel and forward of said bearing edge whereby forward pressure on said locked wheel causes said first member to tend to rotate about said pivot thereby increasing the locking force; and means for locking said wheel against rearward motion comprising s second member having an edge bearing transversely against the periphery of said wheel, said second member being rotatably mounted on a pivot, the pivot on which said second member is mounted extending in the same direction as the axle of said wheel and being positioned radially outward from the periphery of said wheel and rearward of the bearing edge of said second member, whereby rearward pressure on said locked wheel causes said second member to tend to rotate about said pivot thereby increasing the locking force; and release means for releasing said means for locking said wheel against forward and rearward motion.

4,018,450

BICYCLE-MOUNTED NOISE MAKER

James T. Rutledge, 7779 Royal Lane, Dallas, Tex. 75230

Filed June 30, 1975, Ser. No. 591,652
Int. Cl.² A63H *5/00*
U.S. Cl. 280—289 R **5 Claims**



1. A noise making attachment adapted to be mounted on a vehicle with at least one wheel having spokes, an elongated brace bar adjacent said wheel and mounted with a wheel axle bolt, comprising:

a. a unitary member comprising a vibratory flap and an elongated, at least partially enclosed, vibratory means for vibrating in response to the vibrations of said flap so that the combined vibrations of said flap and elongated means simulate the sound of a motorcycle, said brace bar extending longitudinally through said elongated vibratory means so as to prevent said attachment from rotating when said wheel rotates; and

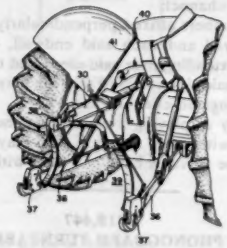
b. a member attached to said unitary member provided with an opening therein adapted to receive the wheel axle bolt of said vehicle for mounting said noise making attachment to said vehicle in a manner such that said flap extends between said spokes, causing said flap to vibrate when said wheel rotates.

4,018,451

TRACTOR THREE-POINT CONNECTION HAVING LEAF SPRINGS

Hubert Geisthoff, and Wilhelm von Allwörden, both of Lohmar, Germany, assignors to Jean Walterscheid GmbH, Lohmar, Rhineland, Germany

Filed July 28, 1975, Ser. No. 599,790
Int. Cl.² B60D *1/16*
U.S. Cl. 280—461 A **9 Claims**



1. A three-point connection on a tractor for coupling implements and the like to the tractor comprising an upper guide member and a pair of lower guide members below said upper guide member, a coupling hook on each of said upper and lower guide members, a pair of leaf springs each having a lower end and an upper end, said leaf spring lower ends being connected to said lower guide member coupling hooks and

said upper ends being nonpivotally connected to said upper guide member, said leaf springs each being curved such that when a force is applied to an end of a said leaf spring the leaf spring will bend in a predetermined direction.

4,018,452

TRACTOR-SCRAPER UNITS WITH PUSH-PULL COUPLING INCLUDING TWO-WAY SHOCK ABSORBERS

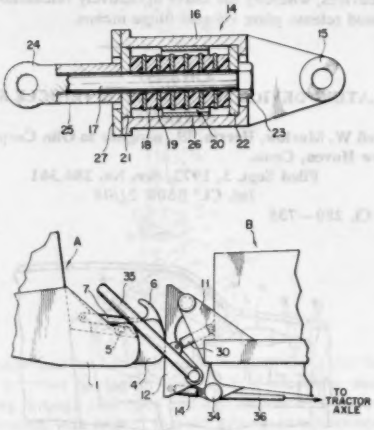
Toshiaki Wagatsuma, Yokohama; Toshitaka Suketomo, Kawasaki; Kouki Yoshida, Kawasaki, and Michio Suga, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Mar. 20, 1975, Ser. No. 560,364

Claims priority, application Japan, Mar. 22, 1974, 49-31692

Int. Cl.² B60D 1/04

U.S. Cl. 280—481 2 Claims



1. A push-pull coupling for a tandem arrangement of earth-moving scraper units comprising:

a first push block fixedly secured to the tail end portion of a forward scraper unit and having a pulling hook projecting therefrom,

a second push block pivotally mounted at the upper end thereof to the front end of a tractor of a rearward scraper unit for contact said first push block to establish a pushing relationship between the scraper units, said second push block having means mounted thereon for engaging said pulling hook in such a manner as to be hooked thereby to establish a pulling relationship between the scraper units, and

at least two sets of two-way, compressive shock absorber means, connected respectively between the lower part of said second push block of said rearward scraper unit and a reinforcing member secured to a tractor framework of said rearward scraper said rearward unit, each of said two-way compressive shock absorbing means being dually effective to lessen shocks between said units both when said forward scraper unit is pushing said forward scraper unit and when said rearward scraper unit is pulling said forward scraping unit.

4,018,453

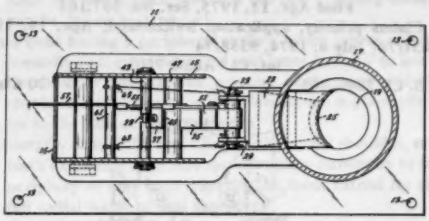
QUICK RELEASE LOCKING DEVICE

Leon J. Bigelow, 1305 Emden St., Wilmington, Calif. 90744

Filed Feb. 12, 1976, Ser. No. 657,551

Int. Cl.² B60D 1/10

U.S. Cl. 280—512 19 Claims



1. Apparatus for releasably fixing structures to one another comprising

a generally spherical member including

means for fixing said spherical member to a first structure and

a receiver member comprising

a housing, means in said housing for seating said spherical member including

movable gate means pivotally mounted in said housing for movement between a first, sphere-released position, a second, sphere-engaged position, and a third, sphere-locked position,

locking bar means pivotally connected to said gate means and having

slot means formed near one end thereof,

a locking rod fixed in said housing in position to be received in said locking bar slot when said gate means is in said third position and to guide longitudinal movement of said locking bar during movement of said gate means,

first means for urging said locking bar toward the position in which said locking rod is seated in said slot,

second means for urging said gate means toward said first position, and

means for manually overcoming the force of said first urging means to move said locking bar slot away from said locking rod.

4,018,454

DEVICE FOR DAMPING VIBRATION OF A SKI

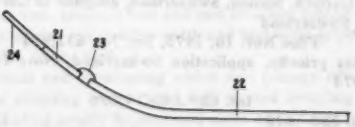
Oskar Burkart, Forst, Baden, Germany, assignor to Hannes Marker, Garmisch-Partenkirchen, Germany

Division of Ser. No. 513,150, Oct. 8, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,185

Claims priority, application Germany, Oct. 9, 1973, 2350656

Int. Cl.² A63C 5/07

U.S. Cl. 280—602 2 Claims



1. A device for damping vibration of a ski comprising, in combination, a tip portion of the ski formed separately from the remaining part of the ski, hinge means including an elastic joint of elastomeric bonding material for connecting said tip portion to the remaining part of the ski to permit independent, resilient movement of said tip portion at substantially a right angle to the tread of the ski, said tip portion comprising a mass

having a reasonant frequency of between 1Hz and 40Hz so as to form a vibratory system for exerting forces on the ski.

4,018,455

BRAKING DEVICE FOR SKIS

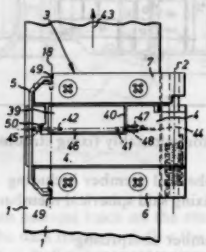
Hans Bieler, Haus Sableun, Bonaduz, Switzerland

Filed Apr. 11, 1975, Ser. No. 567,102

Claims priority, application Switzerland, Apr. 19, 1974, 5431/74; July 8, 1974, 9358/74

Int. Cl.² A63C 7/10

U.S. Cl. 280—605 **20 Claims**



1. A ski braking device for braking a ski when it becomes accidentally detached from a skier's boot, the device comprising a frame adapted to be fixed to the top surface of a ski, a rigid braking lever mounted to pivot about an axis on said frame which extends fore and aft of the ski from a first angular position, in which said braking lever extends from the end thereof at the said pivot transversely across the top surface of the ski to an outer end located essentially on the opposite side of the ski, to a second angular position in which said braking lever pivots more than 180° about said axis to extend downwards beneath the ski, said lever having a low profile positionable beneath the skier's boot in said first position, a holding device located at the outer end of the lever when said lever is in said first position and movably mounted on said frame between a first location at which said holding device engages said outer end of the braking lever to hold the braking lever in said first angular position and a second location at which said holding device is moved out of the path of the lever to release said outer end and hence release said braking device for movement to the second angular position upon separation of the skier's boot therefrom, resilient means operative on said braking lever to turn said braking lever automatically from said first angular position to said second angular position when released by said holding device and upon separation of the skier's boot from the lever, and fixing means for automatically fixing said braking lever, immediately on reaching said second angular position, against resilient turning movement back towards said first angular position.

4,018,456

SKI BINDING WITH RELEASE PLATE

Ulrich Gertsch, Matten, Switzerland, assignor to Gertsch AG, Zug, Switzerland

Filed Nov. 18, 1975, Ser. No. 632,994

Claims priority, application Switzerland, Nov. 19, 1974, 15349/74

Int. Cl.² A63C 9/086

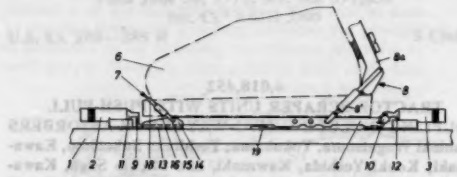
U.S. Cl. 280—618 **17 Claims**

1. A ski binding with release plate for a ski boot having a sole, and a ski having thereon release devices, respectively, for holding the release plate to the ski, comprising

a release plate substantially corresponding to the distance from the heel of the boot to the ball of the foot,

pivot pin means adapted on said ski for rotatably and removeably liftably mounting said release plate in a vicinity of an imaginary extension of the axis of the leg of the skier, said release plate being operatively releaseably held to the side and/or upwardly by the respective release devices, and

a hinge means for permitting a pivotal movement of said release plate relative thereto about a transverse axis disposed in a range corresponding to the ball of the foot of the skier only operative upwardly away from the ski, including a rigid abutment means beneath said release plate for preventing a pivotal movement of said plate



downwardly toward the ski by contacting a lower surface of said release plate,

said hinge means further includes a front holding part extending integrally on said hinge means to a position in front of a front end of said release plate as well as in front of a front tip of the boot. respectively, said front holding part cooperates with a corresponding of said release devices, whereby the latter operatively releaseably holds said release plate via said hinge means.

4,018,457

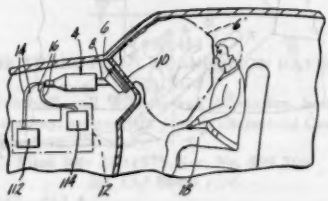
INFLATING DEVICE FOR USE WITH VEHICLE SAFETY SYSTEMS

Darrell W. Marlow, Herrin, Ill., assignor to Olin Corporation, New Haven, Conn.

Filed Sept. 5, 1972, Ser. No. 286,361

Int. Cl.² B60R 21/08

U.S. Cl. 280—735 **1 Claim**



1. An apparatus for use in a safety system of the type utilizing an inflatable member, a stored fluid under pressure, and propellant charge means for the generation of a hot gas, said apparatus including fluid storage means for storing a fluid under pressure, propellant storage means for storing a propellant charge, means normally sealing said propellant storage means from said fluid storage means and operable to provide communication between the propellant storage means and the interior of said fluid storage means if the system is actuated, a nozzle between said fluid storage means and said propellant storage means having a predetermined throat area, means for igniting said propellant charge in response to the sensing of a condition wherein slow deployment of the system can be used and for igniting said propellant charge and for reducing the effective throat area of said nozzle means when fast deployment of the system is required, means for releasing the gas generated by the propellant charge and the stored fluid from the fluid storage means if the system is actuated, said nozzle having at least two orifices therethrough, said means for igniting said propellant charge for slow and fast deployment of the system and for reducing the throat area of said nozzle means for fast deployment including ignitor means for igniting said

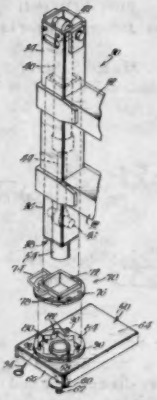
propellant, means for causing the firing of said first ignitor means in response to the sensing of a condition wherein both slow and fast deployment of the system is desired, and means for at least partially closing at least one of said orifices while leaving at least one of said orifices at least partially open in response to the sensing of a condition wherein fast deployment of the system is required, said means for at least partially closing at least one of said orifices includes a rod member in alignment with and spaced from one of said orifices, an ignitor member associated with said rod member, and means for causing the firing of said second ignitor means in response to the sensing of a condition wherein fast deployment of the system is required to move the rod member into a position closing the orifice with which it is aligned.

4,018,458

VEHICLE STABILIZER WITH ADJUSTABLE FOOT

John F. Shumaker, Mount Pleasant, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Sept. 22, 1975, Ser. No. 615,246
Int. Cl.² B60S 9/12
U.S. Cl. 280—766 **11 Claims**



1. A stabilizer for a vehicle comprising an elongated hollow tubular member having an open end, a telescopic member extending through said open end and disposed for reciprocable movement with respect thereto, drive means between said members for reciprocating said members with respect to each other, a ground engaging foot, mounting means rotatably supporting said foot for rotation on a free end of said telescopic member about an axis generally parallel to the telescopic member at said free end thereof with a center of said foot being laterally offset from said axis, and latch means between said telescopic member and said foot for holding said foot in a plurality of rotated positions with respect to said telescopic member.

4,018,459

SUBMAIN CONNECTOR

David E. Mominee, Covina, and Gilbert W. Vance, El Monte, both of Calif., assignors to Reed Irrigation Systems, El Monte, Calif.

Filed July 30, 1975, Ser. No. 600,469
Int. Cl.² F16L 41/00
U.S. Cl. 285—5 **1 Claim**

1. An assembly comprising:

a first flexible header having a wall and a passage, said passage being adapted to have fluid therein, said wall having an opening providing access to said passage;

first and second coupling sections of plastic material;

said first coupling section having inner and outer ends, a head adjacent the inner end, a shank extending from the head toward the outer end, and an internal surface defining an axially extending passage extending completely through said first coupling section from the inner end to the outer end;

said internal surface of said first coupling section defining at least one wrench flat whereby the first coupling section can be driven by a wrench;

said head having a peripheral surface which tapers radially inwardly as it extends toward said inner end and an annular shoulder adjacent the juncture of the head and the shank, said shoulder lying in a plane which is perpendicular to the axis of said passage;

a plurality of radially extending teeth on said shoulder, said teeth extending from said shank radially outwardly to the periphery of said head whereby the teeth extend for the full radial width of said shoulder;

said shank having external screw threads thereon, said threads being spaced from said shoulder to define an unthreaded portion of said shank;

the material of the wall of said first header around the opening being stretchable to permit the head to be forced through the opening and into the passage of the first header; said shank extending through said opening to the exterior of the first header with the opening surrounding said unthreaded portion;

a second coupling section of plastic material having an axially extending passage extending completely through the second coupling section, said second coupling section terminating at one end in an end face;

internal screw threads in said passage of said second coupling section adjacent said one end threof whereby the coupling sections can be attached with the shank at least partially received within the passage of the second coupling section, with said passages being in communication, and with a region of the wall around the opening in the first header being clamped between the end face and the shoulder whereby the coupling sections can be mounted on the first header in substantially fluid tight relationship therewith, said end face and said shoulder having approximately the same radial width and said teeth gripping said region of the wall;

said outer end terminating within said passage of said second coupling section and said second coupling section extending axially beyond said outer end of said first coupling section;

a second header having a passage;

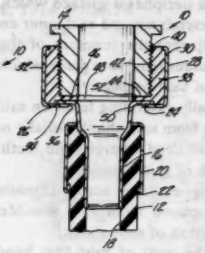
tubular means cooperable with said second coupling section for attaching said second header to the second coupling section; and

said passages of said coupling sections providing communication between the passages of said headers.

4,018,460
HOSE COUPLING

Roy H. Morris, Battle Creek; George L. Turner, Hickory Corners, and Walter L. Hixon, Augusta, all of Mich., assignors to American Stamping Company, Battle Creek, Mich.

Filed Oct. 28, 1975, Ser. No. 626,116
Int. Cl.² F16L *35/00*
U.S. Cl. 285—39 11 Claims

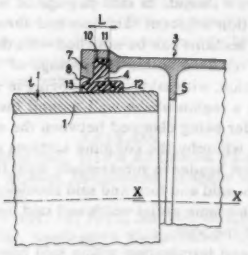


1. A hose coupling comprising; a tubular element having one end adapted for fastening to a hose in nonrotatable relation thereto, a housing assembly including a shell and a lining element disposed in said shell, said lining element having internal threads adapted for threaded attachment to a fitting, said shell having a radially inwardly extending portion, said lining element having a radially inwardly extending flange spaced from the portion of said shell to form an annular groove therebetween, and a collar formed by said tubular element and extending radially outwardly from the other end thereof, said collar being rotatably disposed in said annular groove for rotational movement of said housing relative to said tubular element, said flange of said lining element forming a seal engagable in sealing relationship with said collar upon engagement of said flange by an end of said fitting.

4,018,461
SEALED JOINT HAVING A SOCKET

Georges Eugene Bram, Pont-A-Mousson, France, assignor to Everitube, Neuilly-sur-Seine, France

Filed Oct. 16, 1975, Ser. No. 623,114
Claims priority, application France, Oct. 22, 1974, 74.35441
Int. Cl.² F16L *17/02*
U.S. Cl. 285—110 7 Claims

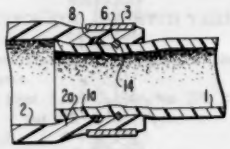


1. A sealed pipe joint comprising means defining a socket having an entrance, means defining a male end extending through said entrance into the socket with a radial clearance and capable of angular deviation relative to the socket, two annular planar faces axially defining an inner annular groove in the socket, a first of said annular planar faces adjacent said entrance having an inner peripheral edge defining an annular clearance with the male end, and an annular elastically yieldable sealing element coaxial with the socket and having at one end of the sealing element an annular substantially smooth solid heel portion disposed in the groove of the socket and a single annular lip portion extending from the heel portion axially inwardly of the socket, the lip portion having an annular end portion which is remote from the heel portion and is in gripping relation to the male end and an annular intermediate portion which is flexible and capable of acting as a hinge, the socket radially defining with the end portion of the lip portion an annular space which allows an angular and radial deviation between the male end and the socket and allows fluid pressure in the pipe access to a side of the end portion radially remote from the male end, the heel portion having, when the sealing element is in a free undeformed state, a width axially of the sealing element which is of the same order of magnitude as the thickness of the heel portion radially of the sealing element and exceeds the axial width of the groove so that the heel portion is compressed between said two annular planar faces, the axial width of the groove being greater than the greatest radial clearance which can exist between the male end and said inner peripheral edge of said first one of said annular planar faces.

4,018,462
PIPE FITTING

Yoshimi Saka, Suzuka, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

Filed Oct. 31, 1975, Ser. No. 627,817
Int. Cl.² F16L *13/14*
U.S. Cl. 285—111 9 Claims



7. In combination telescoping inner and outer elastic synthetic resin pipes, said inner pipe having an outer diameter on the order of the inner diameter of said outer pipe and elastic packing and a hard intrusion ring partially received within respective annular grooves on the periphery of one of said pipes and between telescoping portions of said pipes, and a press ring of an initial diameter on the order of the outer diameter of said outer pipe positioned on said outer pipe overlying said packing and intrusion rings and uniformly compressed to a diameter less than its original diameter with bulged out opposed portions at circumferentially spaced positions such that said synthetic resin pipes are elastically compressed with the packing ring compressed within its annular groove and forming a leak tight seal between said elastic synthetic resin pipes and said intrusion ring including a portion penetrating the part of said pipe opposite that carrying said groove within which said intrusion ring is partially received such that longitudinal slippage between the press fitted pipes is prevented.

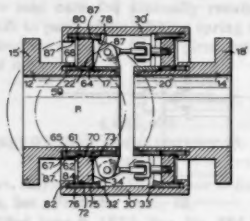
4,018,463
PIPE STRESS/STRAIN NEUTRALIZER

Joseph K. Campbell, 423 Shannon Way, Tsawwassen, British Columbia, Canada (V4M 2W7)

Filed Apr. 30, 1976, Ser. No. 682,136
Claims priority, application Canada, Oct. 7, 1975, 237201
Int. Cl.² F16L *27/04*
U.S. Cl. 285—166 7 Claims

1. A pipe joint comprising: a first pipe end and a second pipe end juxtaposed in substantial alignment, each pipe end defining an outer sealing surface, a sleeve member spanning between and externally of both pipe ends and defining two

inner sealing surfaces laterally aligned with the outer sealing surfaces of the pipe ends, a first annular ring structure having an inner sealing surface for sliding engagement with the outer sealing surface of said first pipe end, and having an outer sealing surface for sliding engagement with one of the inner sealing surfaces on said sleeve member, a second annular ring structure having an inner sealing surface for sliding engagement with the outer sealing surface of said second pipe end, and having an outer sealing surface for sliding engagement with the other of the inner sealing surfaces on said sleeve member, first articulating means connecting said first annular ring structure to said second pipe end, and second articulating means connecting said second annular ring structure to said first pipe end.



4,018,464
TAPPING TEE

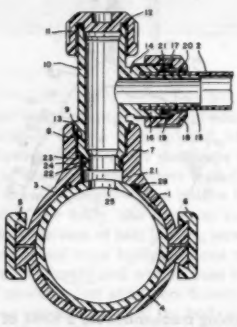
Petrus Marinus Acda, Enkhuizen, and Hans Edward Guitoneau, Bovenkarspel, both of Netherlands, assignors to Polva-Nederland B.V., Netherlands

Filed Sept. 5, 1975, Ser. No. 610,567

Claims priority, application Netherlands, Sept. 17, 1974, 7412287

Int. Cl.² F16L 5/00

U.S. Cl. 285—197 **2 Claims**



1. Tapping tee for connecting a main pipe to a branch pipe, comprising a saddle-shaped part and a tubular tapping member which is rotatable about an axis at right angles to the main pipe and is provided with a branch-receiving socket for coupling to a branch pipe having a given inner diameter and a given outer diameter, characterized in that the branch-receiving socket of the tubular tapping member has integral coupling parts which comprise a support pipe having an outer diameter which corresponds to said given inner diameter and a sleeve which is arranged coaxially with the support pipe, the inner diameter of at least a portion of the sleeve corresponding to the outer diameter of the branch pipe, the sleeve having an outer surface provided with a screw thread for mounting a nut, a distal end of the sleeve having an enlarged bore having a diameter and a length sufficient to accommodate at least part of a wedge-shaped retainer on a branch pipe to be coupled.

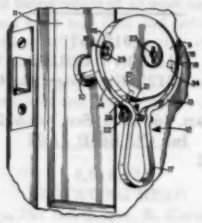
4,018,465
DOOR OPENING DEVICE

David A. Ramler, 155 Shaw Road, Chestnut Hill, Mass. 02167

Filed Oct. 20, 1975, Ser. No. 624,269

Int. Cl.² E05B 3/00

U.S. Cl. 292—336.3 **3 Claims**



1. A device for assistance in opening a door having a round knob and a shank extending from the knob through said door, said device comprising:

an elongated lever arm; and

means for coupling said lever arm to said knob in such a manner that said knob rotates when forces are applied to said lever arm which are substantially parallel to the plane of said door;

said lever arm comprising a pair of yolk arms encompassing at the open ends of said yolk arms a portion of the periphery of said knob;

said means for coupling said lever arm to said knob comprising diametrically opposed pins formed on the ends of said yolk arms, said knob being formed with diametrically opposed holes in the periphery thereof, said ends being seated in said holes in said knob.

4,018,466
VEHICLE BUMPER ASSEMBLY

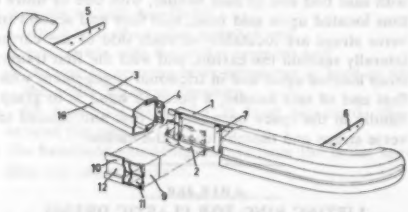
Stig Ivar Norlin, Trollhattan, Sweden, assignor to Saab-Scania Aktiebolag, Linkoping, Sweden

Continuation of Ser. No. 135,686, April 20, 1971, Pat. No. 3,901,543. This application Aug. 26, 1974, Ser. No. 500,902

Claims priority, application Sweden, Apr. 20, 1970, 5441/70

Int. Cl.³ B60R 21/14

U.S. Cl. 293—71 R **5 Claims**



1. A shock-absorbing bumper comprising a rigid mounting member intented to be securely mounted substantially across the width on at least one end of a vehicle,

a plurality of discrete resilient shock absorbing honeycomb members having honeycomb cells of polygonal cross-sectional shape, wherein adjacent cells have at least one contiguous wall and the longitudinal axes of said cells are disposed substantially parallel to the direction of travel of said vehicle, said honeycomb members being disposed over a width approximating that of the mounting mem-

ber, each honeycomb member having a cell depth greater than the width of an individual cell, said cells having a memory to return to their extended longitudinal configuration after impact;

an outer shell encasing said resilient honeycomb members to provide an exterior surface and to simulate a conventional bumper; and

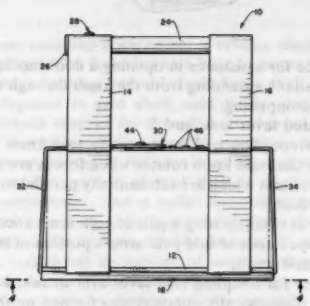
mounting means for securing the outer shell and said resilient honeycomb members to the mounting member to form a unit for absorbing shock across the width of the vehicle.

4,018,467

CARTON CARRIER

Harold L. Salvesen, 2127 Grandview S., Oceanside, Calif. 92054

Filed Oct. 16, 1975, Ser. No. 622,945
Int. Cl.² B65D 71/02
U.S. Cl. 294—31.2 7 Claims



1. A carton carrier comprising:

a base, said base adapted to receive thereon at least one carton;

a first transverse strap attached to said base and enclosing a first enclosed area;

a second transverse strap attached to said base and enclosing a second enclosed area, said second transverse strap being spaced from said first transverse strap forming a space;

an elongated handle having a first end and a second end, said second end of said handle being fixedly secured to said second transverse strap, said first end of said handle detachably connectable with said first strap with said first strap being capable of being removed from association with said first end of said handle, with one or more cartons located upon said base, said first and second transverse straps are locatable on each side of the carton to laterally restrain the carton, and with the first transverse strap located upon and in frictional engagement with the first end of said handle, a person's hand is to grasp the handle in the space between the first and second transverse straps and thereby carry the carton.

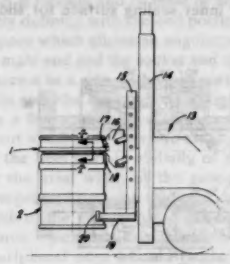
4,018,468

LIFTING RING FOR PLASTIC DRUMS

Merlin L. Lundquist, 2626 Country Club Court, Stockton, Calif. 95204

Filed May 28, 1976, Ser. No. 690,996
Int. Cl.² B66C 1/10
U.S. Cl. 294—67 BA 3 Claims

1. In the combination of an upright drum, and a lifting ring surrounding, and secured to, the sidewall of the drum; the improvement characterized by the drum sidewall having a horizontal circumferential groove formed therein in spaced relation below the upper end of said drum, and the lifting ring being tightly seated in the groove; said lifting ring including an integral, annular, vertically facing flange projecting radially outwardly from the groove to an outer edge termination a distance beyond the drum sidewall, and an annular lip formed integrally with and upstanding from the outer edge of said



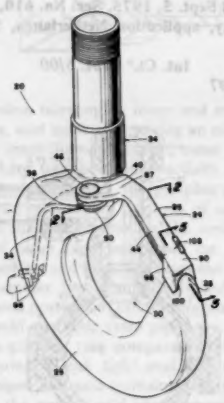
annular flange and spaced substantially said distance from the drum sidewall whereby the upstanding lip is exposed exteriorly of the drum or ready, unobstructed access from above and gripping engagement by a gripping device of a drum lifting and transporting vehicle.

4,018,469

GATE LATCHING MECHANISM FOR HOIST HOOK

Bobby G. Stoops, Tulsa, Okla., assignor to Don R. Hinderliter, Inc., Tulsa, Okla.

Filed Oct. 28, 1975, Ser. No. 626,356
Int. Cl.² B66C 1/36
U.S. Cl. 294—82 R 6 Claims



1. A gate latching mechanism for a hook of the type having a stem and a bight terminating in a tip spaced from said stem to form a mouth; said gate latching mechanism including an arm having one end thereof pivotally connected to said stem and rotatable about a first pivot axis spaced from and parallel with the central axis of said stem for movement of said arm towards and away from a position over the mouth of said hook, said arm having an opposite free end engagable with said tip for closing the mouth of said hook for preventing a load line placed within said hook from slipping out of said hook; said arm including a latch pivotally mounted on the free end of said arm and movable towards said tip for engaging the sides thereof and for restraining said arm from moving to open the mouth of said hook; a locking means mounted on said arm and engagable with said latch for locking said latch in its tip-engaging position; said latch being pivotally mounted in said arm on a second and transverse pivot axis such that the

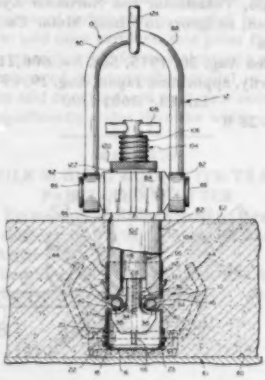
portion of said latch which engages said tip is on the side of the second pivot axis away from said arm; a cam included in said locking means mounted in said arm and rotatable about an axis substantially parallel to the second pivot axis and on the side of the second pivot axis toward said arm; a nib on said latch projecting towards said cam for engaging said cam; said cam being rotatable in a given rotary direction to permit said nib to pass said cam whereby said latch can be pivoted out of engagement with said tip; a lever included in said lock means connected to said cam for manually rotating said cam to permit said nib to pass; and a locking spring biasing said cam in a rotary direction opposite to said given rotary direction for engaging said nib.

4,018,470

ANCHOR INSERT FOR EMBEDMENT IN A CONCRETE SLAB

Dennis W. Tye, Hayward, Calif., assignor to Superior Concrete Accessories, Inc., Franklin Park, Ill.

Filed June 9, 1975, Ser. No. 584,740
Int. Cl.² B66C 1/66; E04C 5/00
U.S. Cl. 294—89 **7 Claims**



1. In an anchor insert adapted to be embedded in a concrete slab for cooperation with a pick-up unit which includes a locking stem having a pair of lift shoulders extending from opposite sides of the stem, said insert including a concrete-excluding cage having a single-walled hollow body and a base closing one end of the body, the opposite end of said body being adapted for insertion of said locking stem and lift shoulders into the cage, said cage being adapted to be emplaced within a form for a concrete slab with its base lowermost in the form, a pair of spaced apart shoulders formed in the wall of said cage body on opposite sides of the body and spaced from said base, said body shoulders extending inwardly of the body to define a pair of downwardly facing internal thrust surfaces on one side of said wall each adapted for lifting engagement in contact with one of said lift shoulders inserted in said cage, said body shoulders also defining a pair of upwardly facing external lift surfaces on the reverse side of said wall each adapted for lifting engagement in contact with an anchor rod section, and a first pair of spaced apart anchor rod sections each defining a downwardly facing thrust surface contacting one of said lift surfaces on the body, whereby said locking stem of a pick-up unit may be inserted in said cage with said lift shoulders disposed beneath said body shoulders, said locking stem thereafter may be rotated and said lift shoulders may be brought into lifting engagement in contact with said thrust surfaces on the body, and a lifting force when imparted to said locking stem is transmitted to said anchor rod sections for lifting a slab in which the insert is embedded, the combination with

a second pair of spaced apart anchor rod sections extending transversely of said first pair of anchor rod sections and fixedly secured thereto on opposite sides of said body,

a pair of foot members disposed beneath each anchor rod section of said second pair, said second pair of anchor rod sections being seated on said foot members, said foot members in each pair being disposed on opposite sides of said cage and spaced outwardly therefrom, said foot members extending below said first pair of anchor rod sections and being adapted to seat on the floor of a slab form to space both said first and second pairs of anchor rod sections inwardly from the adjacent external surface of a formed slab, and

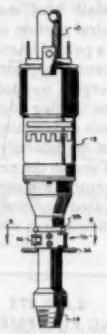
strut means extending outwardly from said base to each of said foot members and fixedly connecting the foot members to the base.

4,018,471

ROTATING HEAD

Clyde J. Shockey, 761 North Ave. B, Kermit, Tex. 79745

Filed July 3, 1975, Ser. No. 593,024
Int. Cl.² B66C 1/62
U.S. Cl. 294—90 **9 Claims**



2. A rotating head clamp adapted to be clamped to a drill pipe below the rotating head to hold same in place comprising:

a. a collar segment in the form of a semicircle,

b. a gate in the form of a semicircle,

c. said gate hinged to the collar segment,

d. latch means interconnecting the collar segment and gate when fastened for holding the gate securely and firmly closed and for forming the collar segment and gate into a circle, and

e. a single arcuate handhold

i. attached to the collar segment and

ii. concentric with the collar segment and

iii. having an opening in its perimeter at least as wide as the collar segment diameter,

iv. the handhold extending at least two-thirds the way around the pipe,

v. the handhold extending further from the collar segment than any other element.

4,018,472

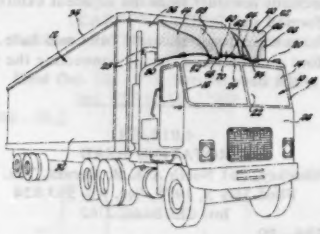
TRACTOR-TRAILER AERODYNAMIC DRAG REDUCER

William T. Mason, Jr., Lake Orion, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 4, 1976, Ser. No. 655,258
Int. Cl.² B62D 35/00
U.S. Cl. 296—1 S **3 Claims**

1. A tractor-trailer aerodynamic drag reducer for use on the roof of a tractor having roof mounted equipment and comprising: a generally wedge-shaped body having a top surface with

a leading edge faired into the tractor roof, the top surface extending rearwardly from the leading edge and diverging upwardly from the tractor roof to streamline airflow over the trailer roof, the wedge-shaped body having side surfaces extending generally vertically between the top surface and the tractor roof with the juncture of the side surfaces and the tractor roof following a curvilinear path providing a concave-convex contour to the side surfaces to divert air smoothly around the sides of the trailer and to streamline crosswind airflow to reduce aerodynamic drag on the tractor-trailer vehicle, the leading edge of the top surface having a central portion recessed rearwardly of outboard portions of the lead-



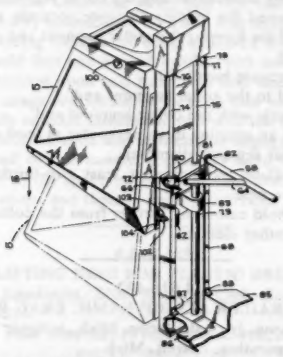
ing edge to accommodate roof mounted equipment, said rearwardly recessed central portion of the leading edge dividing the top surface into a pair of laterally spaced outboard top surface portions and a central top surface portion, the central top surface portion diverging upwardly and rearwardly from the central portion of the leading edge and into tangency with the top surface, and a pair of laterally spaced walls depending generally vertically from the laterally spaced top surface portions to the tractor roof and to the central top surface portion to cooperate with the central top surface portion, the tractor roof and the roof mounted equipment to define a recessed channel which imparts a low-drag streamline curvature to the airflow.

4,018,473

MATERIAL HANDLING EQUIPMENT OPERATOR'S CAB MOUNTING

Paul A. Chalupsky, Cedar Rapids, Iowa, assignor to FMC Corporation, San Jose, Calif.

Filed Dec. 9, 1974, Ser. No. 530,773
Int. Cl.² B62D *27/00*
U.S. Cl. 296—28 C **3 Claims**



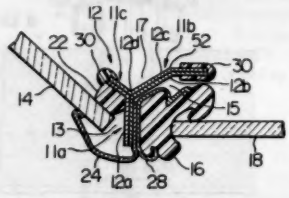
1. In material handling equipment, the combination comprising a carrier, a machinery platform being mounted upon the carrier for rotation in a generally horizontal plane about a substantially vertical axis, an elevating mechanism being attached to the machinery platform at a location offset from the axis of rotation of the platform, and an operator's cab being supported by the elevating mechanism to move vertically between a level where overhead clearance above the cab is provided for transport and various elevated levels thereabove where the operator has unobstructed visibility of the work, said elevating mechanism further including a support frame, a pair of hydraulic cylinders being mounted within the support frame and having actuating arms extending upwardly therefrom, a support bracket being attached to the upper rear portion of the operator's cab and being supported by the actuating arms of the hydraulic cylinders adjacent one side of said support frame, and at least one pair of guide brackets projecting rearwardly from the lower portion of the operator's cab, each guide bracket encircling in a horizontal plane the outside circular surface of a respective one of said hydraulic cylinders to bear laterally against the cylinder surface in response to horizontal forces on the bracket existing between said operator's cab and said cylinder and to slide vertically along the cylinder in response to vertical forces on the bracket.

4,018,474

VEHICLE BODY CONSTRUCTION WITH SLIMLY SHAPED FRONT PILLAR

Yoshihiro Kajio, Yokohama, and Norimoto Aya, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 20, 1975, Ser. No. 606,213
Claims priority, application Japan, Aug. 29, 1974, 49-98411
Int. Cl.² B60J *1/00*
U.S. Cl. 296—28 R **8 Claims**



1. A vehicle body construction comprising a windshield, a window glass panel and a front pillar consisting of three wall members assembled together to form a substantially central core portion having a minimized cross-sectional area and being substantially hollowless, by joining one another at an edge region of each wall member and extend from said core portion each at angles with the other two wall members such that said front pillar has a cross-section generally in the shape of the letter Y over a length substantially corresponding to the length of a lateral edge of said windshield, said front pillar being arranged such that said windshield being received in a first one of three sides of said front pillar, a weather strip for a front edge of a window glass panel being received in a second side of said front pillar, the third side of said front pillar being exposed to the interior of the body.

4,018,475

DOOR SYSTEM FOR VEHICLES

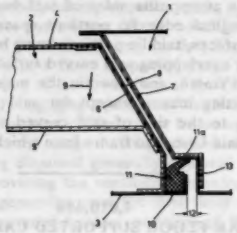
Heinrich Richtermeier, Barnstorf, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Apr. 17, 1975, Ser. No. 569,101
Claims priority, application Germany, May 14, 1974, 2423296
Int. Cl.² B60J *5/04*
U.S. Cl. 296—28 R **4 Claims**

1. A door system for vehicles, e.g. motor vehicles, comprising:

a door with an inner and an outer door surface and an end

face plate connecting them at an end of the door adapted to accept a door lock, said end face plate running diagonally with respect to said door surfaces in top view over at least part of its length such that the width of the door increases in the direction from said inner door surface towards said outer door surface, said outer door surface having a flange region adjacent said end face plate and projecting beyond it; and



a pillar with a diagonal face running substantially parallel to said end face plate and defining a diagonal gap between said pillar face and said end face plate, which gap has a width measured substantially parallel in top view with respect to said door surfaces, said pillar further comprising an outer region that forms a clearance with said flange region measured substantially parallel in top view with respect to said door surfaces, said clearance being dimensioned significantly wider than the width of said gap.

4,018,476

AUTOMOBILE SLIDING ROOF WITH TRANSPARENT PANEL AND SHUTTER

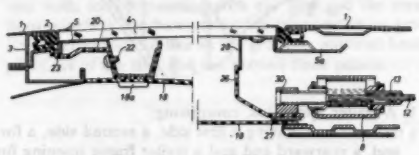
Alfons Lutz, Emmering, and Hans Jardin, Krailling, both of Germany, assignors to Webasto-Werk W. Baier KG, Stockdorf near Munich, Germany

Filed Nov. 24, 1975, Ser. No. 634,444

Claims priority, application Germany, Jan. 24, 1975, 2502775

Int. Cl.² B60J 7/00

U.S. Cl. 296—137 F **10 Claims**



1. In a sliding roof structure for automobiles having a generally horizontal sliding roof panel closing a generally rectangular opening in the roof structure, from which opening said panel is removable by means of an opening mechanism which lowers the rear portion of the panel in a pivoting motion about its front edge and retracts the lowered panel underneath the adjacent stationary roof portion, a sliding roof assembly comprising in combination:

a transparent rigid sliding roof panel serving as a skylight in the closed position;

a roof frame extending along at least the front and side edges of the roof opening underneath the latter;

panel guides defined by the roof frame and extending substantially horizontally on both sides of said roof panel, the guides being engaged by guide shoes mounted on the forward portion of the roof panel;

a generally horizontal opaque canopy panel arranged a distance underneath the sliding roof panel and engaging the roof frame surrounding the roof opening, so as to serve as a closing member or blind to control the amount of light entering through the roof panel;

laterally spaced canopy guides supporting the canopy panel for longitudinal displacement therealong independently of the roof panel, so that the canopy can be opened while the transparent roof panel remains closed; and

shutter means arranged in the space between the roof panel and the canopy panel underneath at least the lateral roof panel edges for covering from view at least a major portion of the roof frame and associated structural elements; the shutter means being connected to the roof panel so as to follow the longitudinal opening and closing motions of the latter;

laterally spaced shutter guides engaged by the shutter means during its longitudinal movement, the shutter means being thus prevented from executing the pivoting motion of the roof panel; and wherein

the shutter means being pivotably connected to the roof panel in the vicinity of the axis about which the roof panel is pivotable.

4,018,477

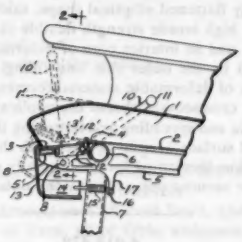
ADJUSTABLE HEIGHT FRONT EDGE FOR VEHICLE SEAT

Gerard T. Hogan, Southington, Conn., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 3, 1975, Ser. No. 627,990

Int. Cl.² A47C 3/00

U.S. Cl. 297—284 **5 Claims**



1. A vehicle seat unit having a unitary cushioned seat section, and an adjustable height front edge portion for said cushioned seat section, said portion comprising in combination,

a. a movable and tiltable front edge portion underneath the forward portion of said cushioned seat section that can be raised and lowered with respect to the remaining more-rearward non-moving portion of the cushioned seat section,

b. a transverse hinging support means connecting between the lower rearward part of said movable front edge portion and said non-moving portion of the seat section whereby said front edge portion can pivot up and down with respect to the non-moving portion,

c. a pivoted height adjusting arm member to be moved by a seat occupant that is attached to the side portion of the vehicle seat unit to move in an arc and in a generally vertical plane, and

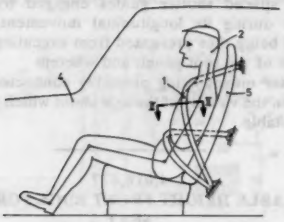
d. a movable transversely positioned horizontal lift bar attached to said pivoted arm member a spaced distance above the pivot point for the latter at a level and in a position to move in a fore and aft manner under said movable front edge portion of the cushioned seat section, whereby such lift bar member can, in turn, be moved through an arcuate path and will serve to raise and lower the superposed movable front edge portion for the cushioned seat section, and

e. a supporting means for said front edge portion of said cushion seat section, said supporting means having a low friction surface from the underside thereof for contact with said movable transversely positioned horizontal lift bar.

4,018,478
SAFETY BELT

Ernst Fiala, Braunschweig-Querum, and Andreas Bauer, Fallersleben, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed May 15, 1972, Ser. No. 253,296
Claims priority, application Germany, May 29, 1971, 2126939
Int. Cl.² A62B 35/00
U.S. Cl. 297—385 4 Claims

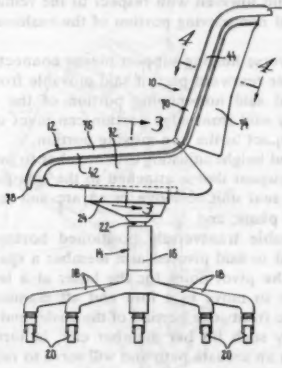


1. A safety belt attached to a vehicle so as to hold passengers secure in the vehicle in the event of a collision, the belt having flexible passenger restraining strands of a generally round crosssectional shape and being elastically compressible to a generally flattened elliptical shape, said strands comprising an outer high tensile strength flexible skin defining a hollow interior, and an interior core of deformable elastic material enclosed by the outer skin and filling the interior, said interior core of deformable material forming the strands into the rounded crosssection absent the application of deforming forces thereto and spreading and flattening the strands to form an increased surface area in contact with the passenger upon the application thereto of forces normally caused by the restraint of the secured passenger by the outer skin.

4,018,479
OFFICE CHAIR

Douglas C. Ball, Senneville, Canada, assignor to Sunar Limited, Waterloo, Canada

Filed Nov. 3, 1975, Ser. No. 628,682
Int. Cl.² A47C 7/02
U.S. Cl. 297—455 3 Claims

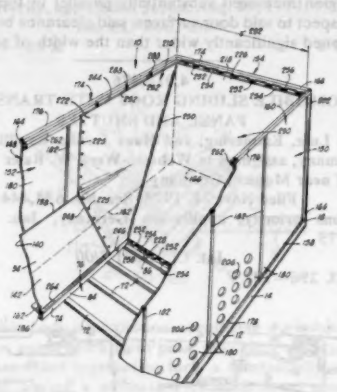


1. A chair comprising: a rigid frame of endless, one piece construction having generally parallel side members each having a seat supporting part and a back supporting part and parallel end members maintaining said side members in spaced apart relationship to each other, said frame being of generally U-shape cross-section having inner and outer parallel legs and a curved surface connecting portion, wherein said inner legs define the inner periphery of said frame and further include flange portions disposed at an angle to said inner leg portions, body support means having a body engaging surface, and having opposite wall portions forming first mounting sufaces projecting away from said body engaging surface for engagement with the inner legs of said frame, said wall portions including second mounting surfaces for complemental engagement with said flange portions of said inner legs, said wall portions at opposite sides of said body support means defining marginal edge lip portions spaced from said first mounting surfaces, said lip portions being in engagement with and partially overlapping said curved surface connecting portions of said frame, and wherein the major portion of said body supporting means, except for said marginal edge lip portions, lie to the side of said curved surface connecting portions of said U-shaped frame from which said legs depend.

4,018,480
GRANULAR-FLOOR SUPPORTED CARGO HAULING TRAILER APPARATUS CONSTRUCTION

Jack C. Stone, 2018 SW. 15, Oklahoma City, Okla. 73108

Continuation-in-part of Ser. No. 423,316, Dec. 10, 1973, Pat. No. 3,901,552. This application Aug. 25, 1975, Ser. No. 607,691
Int. Cl.² B60P 1/56
U.S. Cl. 298—27 13 Claims



1. A trailer apparatus, comprising:
a trailer frame, having a first side, a second side, a forward end, a rearward end and a trailer frame opening formed through a portion thereof;
a first side wall connected to the first side of the trailer frame and extending a distance upwardly therefrom having ventilation openings formed therethrough;
a second side wall connected to the side of the trailer frame and extending a distance upwardly therefrom having ventilation openings formed therethrough;
a forward end wall connected to the forward end of the trailer frame;
a rearward end wall connected to the rearward end of the trailer frame, the first side wall, the second side wall, the rearward end wall and the forward end wall each cooperating to form a substantially continuous wall extending about the trailer frame;
a hopper, having an open upper end defining a hopper inlet opening and an open lower end, the space between the upper end of the lower end defining a hopper material bin space for retainingly storing granular material and the like, the upper end connected to the trailer frame in communication with a portion of the trailer frame opening;
a hopper door connected to the hopper and positionable in

a closed position substantially closing the open lower end of the hopper cooperatingly retaining the granular material and the like within the hopper material bin space and an open position discharging the granular material and the like from the hopper material bin space via the open lower end of the hopper; and

a trailer floor assembly positionable in a floor supported cargo hauling position and a granular material hauling position, comprising:

a first floor panel, having opposite ends, opposite sides, and an upper and a lower face removably supported on a portion of the trailer frame, the first floor panel being positionable in a floor supported cargo hauling position, a portion of the lower face of the first floor panel supportingly engaging a portion of the trailer frame and covering a portion of the trailer frame opening in the floor supported cargo hauling portion, the first floor panel being disposed generally adjacent the first side wall and covering the ventilation openings in the first side wall generally near the first floor panel in the granular material hauling position of the first floor panel;

a second floor panel, having opposite ends, opposite sides, and an upper and a lower surface removably supported on a portion of the trailer frame, the second floor panel being positionable in the floor supported cargo hauling position, a portion of the lower face of the second floor panel supportingly engaging a portion of the trailer frame and covering a portion of the trailer frame opening in the floor supported cargo hauling position, the second floor panel being disposed generally adjacent the second side wall and covering the ventilation openings in the second side wall generally near the second floor panel in the granular material hauling position of the second floor panel, the first and the second floor panels cooperating to form a portion of a trailer floor supporting surface for supporting floor supported cargo in the floor supported cargo hauling positions, and communication being established with a portion of the hopper material bin space via a portion of the trailer frame opening in the granular material hauling positions of the first and the second floor panels; and

means removably connected to portions of the first and the second side walls and to the rearward and the forward end walls for cooperating with the first and the second floor panels to form a material bin space retaining granular material and the like in the granular material hauling positions of the first and the second floor panels.

4,018,481
GASIFICATION OF COAL IN SITU

Ruel Carlton Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Filed Mar. 8, 1976, Ser. No. 665,128
Int. Cl.² E21C *43/00*
U.S. Cl. 299—4 **18 Claims**

1. A method of gasifying coal in situ wherein the underground coal deposit has been preheated to a temperature above the ignition point temperature comprising the steps of:

establishing fluid injection and fluid removal passages connecting the coal formation to a surface location,

establishing a fluid passage through the coal interconnected with the fluid injection and removal passages,

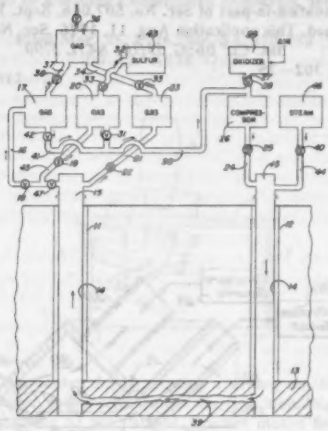
injecting an oxidizer,

gasifying the coal and

capturing the gases at the surface;

terminating oxidizer injection, then

injecting a reducing reactant fluid,



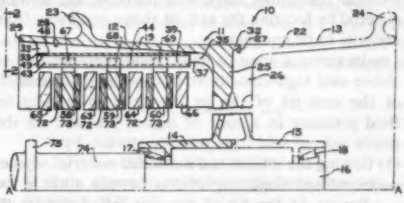
gasifying the coal, and

capturing the gases at the surface.

4,018,482
RIM CONSTRUCTION FOR WHEELS HAVING BRAKE TORQUE DRIVES

Vijay Rastogi, Akron; James Michael Budd, and Daniel Lynn Koehler, both of Troy, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed June 19, 1975, Ser. No. 588,178
Int. Cl.² B60B *21/08*
U.S. Cl. 301—6 E **9 Claims**



1. A rim construction for a wheel and brake assembly in which said rim is generally cylindrical and coaxial with the axis of said wheel and brake assembly and in which said rim has a radially inner surface comprising a torque-transmitting lug integral with said rim extending radially inward from and axially across said inner surface from one end to the other end of said lug, axially extending side faces on said lug for transmitting torque to said rim from brake members of said assembly and a radially inner face of said lug spaced radially inward from said inner surface of said rim by a distance equal to a thickness of said lug, said lug being recessed at a position along the axial length thereof, said thickness of said lug at said position being less than said thickness of said lug at another position spaced apart axially along said lug to reduce the stresses in said lug and rim during operation of said wheel and brake assembly.

4,018,483

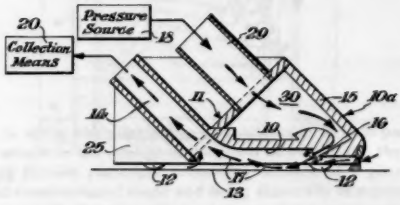
PROCESS AND APPARATUS FOR DISLODGING AND CONVEYING MATERIAL FROM A SURFACE WITH A POSITIVE PRESSURE FLUID STREAM

D. Kermit Smith, 1700 Sabra Drive, Kinston, N.C. 28501

Continuation-in-part of Ser. No. 507,046, Sept. 18, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,398

Int. Cl.² B65G 53/10; A47L 5/00

U.S. Cl. 302—25 19 Claims



11. In a process for dislodging and conveying material from a normally horizontal material containing surface and normally upwardly into a discharge duct with a positive pressure, high-velocity stream of fluid from an unenclosed jet device; the improvement comprising:

(a) jetting the fluid from an exit jet having an upper side terminating to form a lip to impinge obliquely onto the material containing surface to dislodge and entrain the material by locating the exit jet above and away from the material to be conveyed;

(b) maintaining a zone of lower fluid pressure in a cavity above said high-velocity stream of fluid adjacent the lip of the exit jet of the jet device with respect to the fluid pressure in a zone of higher pressure on the opposite side of said high-velocity stream, by,

(1) flowing the stream and entrained material adjacent an unenclosed fluid impervious coanda surface located adjacent to the lip of the exit jet of the jet device and disposed normally above the stream on a side of the stream opposite to that of the material to be conveyed, said fluid impervious coanda surface having said cavity located immediately adjacent and above the lip of the exit jet device, and

(2) allowing substantial fluid outside of said jet device to flow into said zone of higher pressure;

to provide separation of said stream from said fluid impervious coanda surface prior to impingement of said stream onto said material containing surface to dislodge and entrain the material with said stream and entrained material then reattaching to and flowing along said fluid impervious coanda surface to further provide wall-attachment of the stream and entrained material to the fluid impervious coanda surface; and then

(c) directing and guiding the stream and entrained material into the discharge duct and associated collection means.

4,018,484

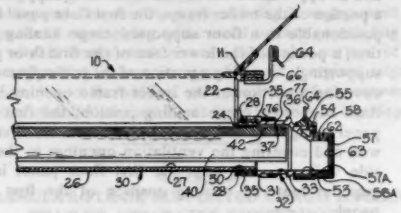
PNEUMATIC OUTLET FOR RECEIVING FEMALE HOSE CONNECTIONS OF DIFFERENT DIAMETERS

Richard H. Dugge, St. Louis, and Ronald D. Van Dyke, Florissant, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Nov. 7, 1975, Ser. No. 629,959

Int. Cl.² B65G 53/52

U.S. Cl. 302—52 8 Claims



1. A pneumatic outlet for receiving female hose connections of different diameters comprising: a tubular conduit extending from at least one side of the outlet including a first annular portion having a first outer surface for receiving a female conduit coupling of one diameter from an unloading conduit adapted to extend from said outlet in a first direction; said first annular portion having a first inner surface of one diameter; a second annular portion projecting axially from the first annular portion and having a second outer surface of smaller diameter than said first outer surface for receiving a female hose coupling of smaller diameter from an unloading conduit adapted to extend from said outlet in said first direction; said second annular portion having a second inner surface of smaller diameter than said first inner surface; the first and second annular portions being eccentric with the lower inner surface of the second annular portion being tangent to the lower inner surface of said first annular portion and having a height not greater than the lower inner surface of the first annular portion to provide an effective flow path for lading discharge and clean-out of the outlet.

4,018,485

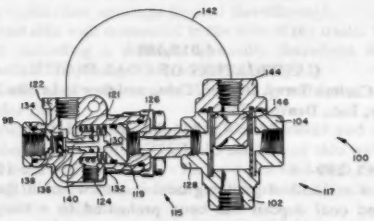
FLUID PRESSURE BRAKING SYSTEM WITH PARKING BRAKE-SERVICE BRAKE INTERLOCK

Richard C. Fannin, Elyria, Ohio, assignor to The Bendix Corporation, South Bend, Ind.

Filed Feb. 17, 1976, Ser. No. 658,213

Int. Cl.² B60T 15/16

U.S. Cl. 303—13 15 Claims



1. In a vehicle fluid pressure braking system having a service braking circuit and a parking braking circuit, a brake actuator having service braking means connected in said service braking circuit and communicated to a fluid pressure source when a service brake application is effected, said brake actuator including parking means connected in said parking braking

circuit for holding said actuator in a brake-applied condition when a parking application is effected, an operator-actuated control valve for controlling communication in said service braking circuit, and actuable to communicate fluid pressure to said service braking means, and interlock valve means responsive to actuation of said control valve to prevent release of said parking means until said control valve is actuated to communicate a predetermined pressure level to said service braking means, said interlock valve means including means responsive to the fluid pressure level in the parking circuit to maintain release of said parking means after the control valve is released until the fluid pressure level in the parking braking circuit drops below a predetermined level.

4,018,486

VEHICLE WHEEL SLIDE PROTECTION SYSTEMS

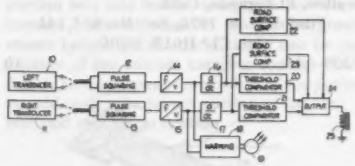
Christopher John Sutton, Tamworth, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Sept. 17, 1975, Ser. No. 614,021

Claims priority, application United Kingdom, Sept. 19, 1974, 40840/74

Int. Cl.² B60T *8/08*

U.S. Cl. 303—97 **2 Claims**



1. A vehicle wheel slide protection system for use with a vehicle wheel provided with brakes, including a wheel speed transducer having first and second output terminals and which produces an oscillatory signal at a frequency dependent on the speed of rotation of the wheel, and a brake control circuit for releasing the brakes of the wheel, in use, when the rate of decrease of said frequency exceeds a predetermined value, said control circuit having an earth terminal and including a comparator input stage for squaring pluses received from the wheel speed transducer and inverting and non-inverting input terminals, comprising first and second input terminals connected to the respective first and second transducer output terminals, a pair of equal value resistors connecting the input terminals of said comparator to the respective inverting and non-inverting input terminals of the comparator, a pair of equal value capacitors connecting the input terminals to said earth terminal of the circuit, a supply with two supply rails, a bias circuit for biasing said comparator input terminals to a d.c. level intermediate the supply voltage, said bias circuit comprising a transistor having a collector, a base and an emitter, said emitter being connected to one supply rail and said collector connected via a load to the other supply rail, a first resistor connecting the base of the transistor to said one supply rail, a second resistor connecting the base of the transistor to one input terminal, and a third resistor connecting the other input terminal to the other supply rail, the transducer normally providing a connection between the input terminals so that the transistor is turned on and current flowing through the base-emitter junction thereof and said second and third resistors biasing the input terminals, the transistor being turned off when the connection between the input terminals by the transducer is severed.

4,018,487

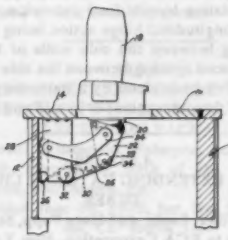
CAM ADJUSTMENT FOR TENSION SPRING OF SEWING MACHINE HEAD LIFTER MECHANISM

John L. Orr, and Robert A. Sewell, both of Rockford, Ill., assignors to Keystone Consolidated Industries, Inc., Peoria, Ill.

Filed Mar. 25, 1976, Ser. No. 670,280

Int. Cl.² A47B *81/00*

U.S. Cl. 312—27 **3 Claims**



1. In a mechanism for supporting a sewing machine head from a cabinet, said mechanism of the type including a housing for mounting on the cabinet, bracket means for attachment to the machine head, linkage arms pivotally attached between the housing and the bracket means, said bracket means being transportable by the arms between a projected head support position and a retracted position, and spring means for biasing the bracket means toward the head support position, the improvement of adjustable spring tension means engaging the spring means to provide adjustable support force by the bracket means for a head, said spring means including an adjustable cam member attached to the housing, a center fulcrum affixed to the housing, a biasing spring having generally oppositely extending first and second ends flexibly connected, said spring being pivoted at the fulcrum so that a force in a counterclockwise sense on the first end of the spring is transmitted through the coil member to impart a counterclockwise force at the second end and vice versa, the first end being held by the cam member attached to the housing and the second end being biased against the bracket, said cam member being pivoted about an axis generally transverse to the axis of the fulcrum to provide any one of a plurality of sring engaging surfaces for contact with the first end, each of said surfaces being separately spaced from the cam pivot axis to provide a distinct force against the first end of the spring which force is imparted to the bracket means for support of a head mounted thereon.

4,018,488

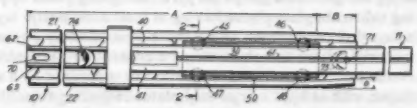
SLIDE BRACKETS

Morris Manson, Great Neck, N.Y., assignor to Corax Corporation, Yonkers, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,303

Int. Cl.² A47B *88/00*; F16C *21/00*

U.S. Cl. 312—348 **3 Claims**



1. A slide bracket comprising first and second elongated members mounted for relative longitudinal sliding movement, said members including respective opposed side walls shaped to define longitudinal ball bearing tracks, ball bearings mounted in said tracks for facilitating the relative longitudinal sliding movement of said members, groove means in at least

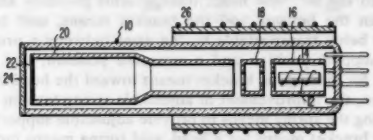
one of said members spaced from said tracks for providing longitudinal hinge action for said members to confer lateral deflectability for said side walls of said tracks to minimize retarding pressure of said walls with the ball bearings and noise resulting therefrom, said members having relative longitudinal movement in a first main section and in a second end braking section, said track extending continuously along said first and second sections, and means in said end braking section for gradually overriding said longitudinal hinge action in said end braking section as said members approach a position of maximum relative longitudinal extension, said means for overriding the longitudinal hinge action being constituted by a reduced spacing between the side walls of the ball bearing tracks, said reduced spacing between the side walls of the ball bearing tracks being obtained by a narrowing taper between the side walls of the outer member in said end braking section.

4,018,489

METHOD FOR EXTENDING CATHODE LIFE IN VIDICON TUBES

Louis Donald Miller, Leola, and Hans Popp, Strasburg, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,562
Int. Cl.² H01J *9/22*
U.S. Cl. 316—5 **5 Claims**



1. A method for processing a vidicon tube having a low melting point target assembly to reduce cathode contamination, said method comprising:
evacuating the tube;
activating the cathode;
heating some of the electrodes within the tube during and after cathode activation to a temperature which will vaporize any contaminants from the cathode activation while maintaining the target assembly below its melting point; and
pumping any vapors emitted by the evaporating and heating steps out of the tube.

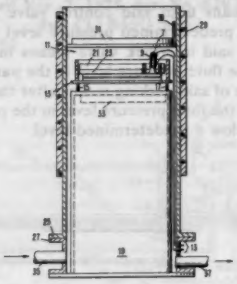
4,018,490

GAS DISCHARGE DISPLAY PANEL FABRICATION

Melvin Berkenblit, Yorktown Heights; Robert O. Lussow, Hopewell Junction; Kyu Chang Park, and Arnold Reisman, both of Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 7, 1975, Ser. No. 593,618
Int. Cl.² H01J *9/38*
U.S. Cl. 316—21 **19 Claims**

1. An in situ process for fabricating gas discharge display panels comprising;
placing unassembled gas panel parts, including panel opposing substrate glass plates having at least a dielectric layer, a layer of conductors, and a layer of secondary emissive material within the chamber of a controlled gas ambient furnace system, so that said plates are separated by a seal frame with at least one of said plates including tubulation means to permit passage of gas between said ambient and the region between said plates;
positioning tip-off means adjacent said tubulation means, so that tip-off may be effected in response to actuation external to said chamber;
initially evacuating said chamber to outgas surfaces therein;
admitting non-contaminating gas into said initially evacuated chamber;
heating said chamber to approximately the sealing temperature of said seal frame to seal said substrate plates together;
evacuating said chamber and sealed panel and admitting inert gas into said chamber and sealed panel after said



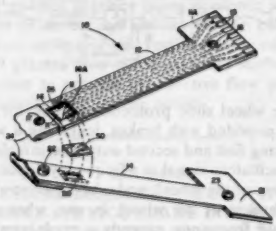
chamber has at least cooled to a point where outgassing from said panel parts and chamber has terminated; and
tipping off said tubulation means at a chamber partial pressure and temperature selected so that the panel is at the desired pressure for room temperature.

4,018,491

CARRIER FOR DEVICES

Andrew J. Niedzwiecke, Perris, and Joseph M. Shaheen, La Habra, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 8, 1976, Ser. No. 665,141
Int. Cl.² H01R *39/00*
U.S. Cl. 339—4 **10 Claims**



1. An apparatus for supporting a device comprising:
a first board having at least one cavity for accommodating said device;
at least one electrical conductor disposed on said first board and extending over said cavity to form beam lead interconnections;
resilient means formed to fit around the inner surface of said cavity for applying force to said beam lead interconnections;
a second board;
hinge means joining said first and second boards; and
locking means for said boards.

4,018,492

ADVANCE GROUNDING SYSTEM FOR ELECTRICAL CONNECTORS

George R. Eckart, Arlington Heights, Ill., assignor to Daniel Woodhead, Inc., Northbrook, Ill.

Filed Sept. 11, 1975, Ser. No. 612,340
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 P **3 Claims**

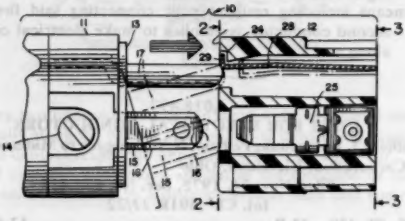
1. An advance grounding system for electrical connectors, including in combination,

a male attachment portion,

electrical current carrying contact blades secured in said male attachment portion and extending outwardly therefrom,

a ground contact blade secured in said male attachment portion and extending outwardly therefrom, the length of said ground contact blade being greater than the length of said electrical contact means,

a female receptacle portion having therein a cut-out portion in the face thereof and female terminal means adated to receive the blades on said male attachment portion, the female ground terminal means which receives the ground contact blade having an angularly extending lip portion



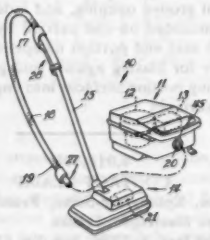
on the outer end thereof received in said cut-out portion so that said terminal means will terminate substantially at the face of the female receptacle portion, and the female terminal means which receive the other contact blades terminating short of the face of said female receptacle portion, whereby, upon the insertion of said attachment portion into said female receptacle portion, said ground contact blade will contact the female ground terminal means before the electrical circuit can be completed by contact of the current carrying contact blades with the female terminal means regardless of the position assumed by said male attachment portion at the time of insertion into said receptacle portion.

4,018,493

VACUUM CLEANER HOSE END STRUCTURE

John Bartholomew Lyman, Bloomington, and Bruce Edmund Stewart, Maplewood, both of Minn., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 7, 1975, Ser. No. 629,843
Int. Cl.² H01R *3/04*
U.S. Cl. 339—15 **12 Claims**



1. In a vacuum cleaner hose having a flexible duct portion, and electrical conductor wires co-axially helically carried by said duct portion, an improved hose end structure comprising:

a molded end portion on the end of said hose duct portion, the end of said wires being disposed in said molded end portion;

first terminal means carried in said molded end portion, said terminal means being connected to said end of the wires, said terminals having a portion exposed outwardly of said molded end portion;

a hose end adaptor having a first end telescopically positioned in said molded end portion and a second, opposite end extending outwardly of said molded end portion;

second terminal means positioned by said adaptor in electrical contact engagement with said first terminal means; and

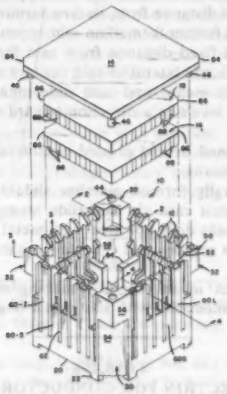
cooperating interlock means on said molded end portion and said hose end adaptor preventing rotational forces tending to cause relative coaxial rotation between said hose end adaptor and said molded end portion from being transmitted to said terminal means.

4,018,494

INTERCONNECTION FOR ELECTRICALLY CONNECTING TWO VERTICALLY STACKED ELECTRONIC PACKAGES

William Samuel Scheingold, Palmyra, and Frank Christian Youngfleish, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed June 10, 1975, Ser. No. 585,440
Int. Cl.² H05K *1/07*
U.S. Cl. 339—17 CF **9 Claims**



1. An interconnecting device useful for connecting a first and second electronic package stacked vertically therein to a printed circuit board, which comprises:

a. a housing of insulating material including a base and walls, said base having one or more support posts and a plurality of holes along each side thereof and the walls containing a plurality of vertical slots which are connected to the holes in the base by horizontal grooves, said housing further having pillars at each corner, said pillars having means thereon for supporting and retaining the first and second electronic packages which may be stacked in the housing in a spaced, overlying relation;

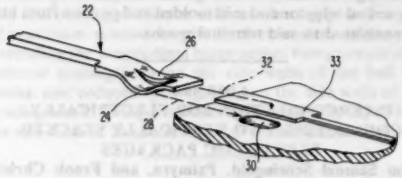
b. a plurality of conductive spring members positioned in the housing, each spring member having an upper finger positioned in a slot, a base positioned in the horizontal groove and a pin extending through the hole and depending from the housing for connection to a printed circuit board, the top of the upper finger having an inwardly projecting nose comprising an upper contact point, said spring member further having a lower finger integral with the upper finger and having an inwardly projecting nose comprising a lower contact point, said upper and lower fingers being preloaded to bias the upper and lower contact points against conductive pads on the first and second electronic packages which may be positioned in the housing in overlying relation; and

c. a cover removably positioned on the top of the housing.

4,018,495
CONNECTOR DEVICE

Walter O. Freitag, Dresher, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,867
Int. Cl.² H01R 13/26
U.S. Cl. 339—17 L 8 Claims



1. An electrical connector device for making a non-slidable ohmic connection with a metal finger of a printed circuit card comprising:

a. an integrally formed member having a slender arm and wider end appendage,

b. a contact means formed on said appendage at a fixed longitudinal distance from its free terminal end,

c. slide means further formed on said appendage at approximately said fixed distance from said free terminal end, and immediately lateral to said contact means,

said contact means and said slide means extending at different levels in a direction toward said printed circuit,

d. means formed in said printed circuit card for receiving said slide means,

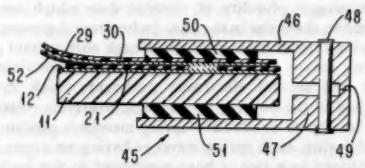
e. said integrally formed member slidably engaging said printed circuit card via said slide means such that said contact means does not meet said metal finger until said slide means reaches said receiving means in said printed circuit,

said contact means thereby making said non-slidable ohmic connection with said metal finger.

4,018,496
INTERCONNECTION FOR CONDUCTOR ASSEMBLIES HAVING CLOSELY SPACED CONDUCTIVE LINES

Malvin S. Bilsback, Woodstock, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 482,825, June 24, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,450
Int. Cl.² H05K 1/08
U.S. Cl. 339—17 F 5 Claims



1. An electrical structure comprising:

a first conductor assembly having a first insulating support of a generally rigid material such as glass and a first set of conductive lines on a surface of said first support, said lines extending generally parallel and having a predetermined spacing that does not vary significantly;

a second conductor assembly having a second insulating support and a second set of conductive lines on a surface of said support, said second insulating support being of a thin, flexible, plastic material such that said conductive lines of said second set are formed and maintained less accurately than the conductive lines of said first set, said lines in a first region of said second set having a spacing that varies progressively from a spacing that is greater than said predetermined spacing of said first set to a spacing that is less than said predetermined spacing of said first set, whereby said predetermined spacing of said first set exists along a line in said first region of said second set regardless of variations in the spacing between lines of said first and second sets within predetermined tolerances;

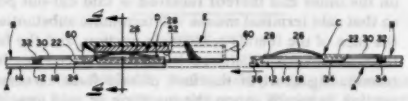
a thin insulation layer covering the regions of said first conductive lines closely adjacent to said line in the region where said spacing of said first lines is less than the spacing of said second lines, and;

means including resilient pads connecting said first and second conductor assemblies to make electrical contact along said line.

4,018,497
JOINT FOR ELECTRICAL CONDUCTORS

William J. Bulanchuk, Pelham, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 24, 1975, Ser. No. 634,418
Int. Cl.² H01R 11/22
U.S. Cl. 339—22 B 13 Claims



1. A joint comprising a pair of elongated electrical conductors having end portions which are connected, said end portions having longitudinal axes, main body portions and joining portions, said joining portions having joining portion surfaces facing generally toward said main body portions in spaced relationship thereto, a connecting member having a longitudinal groove therein, said groove having a longitudinal groove opening along the length of said connecting member and opposite end groove openings at the opposite ends of said connecting member, said groove having a groove bottom spaced inwardly of said connecting member from said longitudinal groove opening, said groove having joining groove surfaces facing generally toward said groove bottom, said end portions of said conductors having said joining portions extending into said groove through said end groove openings with said longitudinal axes aligned, said main body portions of said end portions being located outside said groove adjacent said longitudinal groove opening, and independent yieldable biasing means mounted on and carried by each said joining portion on each said end portion independently of said connecting member for biasing against said groove bottom and urging said joining portion surfaces into engagement with said joining groove surfaces.

4,018,498
CONTACT CLAMP

Alain Lascarrou, Epinay-sur-Seine, France, assignor to La Telemecanique Electrique, France

Filed Dec. 3, 1975, Ser. No. 637,257
Claims priority, application France, Dec. 17, 1974, 74.41481
Int. Cl.² H01R 13/12
U.S. Cl. 339—65 2 Claims

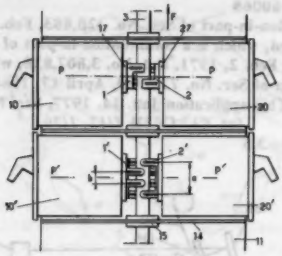
1. An electrical distribution board comprising a cabinet, defining a plurality of housing sections, a vertical bus bar structure disposed centrally in said cabinet, said housing sections being disposed in opposed positions on both sides of said bus bar structure,

a plurality of electrical units adapted to be positioned in opposed pairs in opposed said sections,

each said electrical unit having at least one connector positioned to engage in electrical relationship with said bus bar structure,

each connector comprising at least one contact clamp having two opposed arms of the same width measured vertically along the bus bar structure, said arms being adapted to contact respective opposite surfaces of a bus bar,

said opposed arms being spaced in the direction of their width dimension by a distance greater than said width.



4,018,499

CONTACT FOR INSULATED WIRE

David William Rickards, Stanmore, England, assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 525,597, Nov. 20, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,183

Claims priority, application United Kingdom, Dec. 18, 1973, 58635/73

Int. Cl.² H01R 9/08

U.S. Cl. 339—97 C **3 Claims**

1. A contact for attachment to an insulating stranded conductor without deforming the conductor, comprising:

a. a plate member stamped and formed from a coplanar sheet of conductive material having a conductor-receiving slot opening into one edge of the plate and defining a pair of spaced arms forming the sides of the slot;

b. a lance protruding into the slot from the base thereof and extending toward the slot opening, said lance adapted to enter between the strands of the undeformed conductor which may be inserted into the slot;

c. said arms and lance being located in the plane of the plate whereby the contact is substantially uniplanar;

d. said arms having free ends adapted to be crimped inwardly towards one another whereby a conductor which may be inserted into the slot will be generally encompassed and secured therein.

4,018,500

JUNCTION PIECE FOR ELECTRICAL LEADS

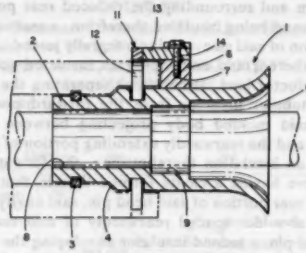
Martin Hamacher, Nimrodstr. 47, 4352 Herten, Germany

Filed July 3, 1975, Ser. No. 593,026

Claims priority, application Germany, Mar. 27, 1975, 2513829

Int. Cl.² H01R 13/58

U.S. Cl. 339—103 R **3 Claims**



1. An improved unitary junction piece for a cable containing electrical leads for an appliance to be supplied with current comprising a funnel-shaped entry at one end of the junction piece for receiving the cable, the other end of the junction piece having an annular groove in an outer wall for receiving a packing ring therein, a bevelled shoulder formed on the outer wall of the junction piece adjacent said annular groove and adapted to engage the inner wall of a socket of the appliance when the junction piece is in position, a recess around the outer wall of the junction piece intermediate the bevelled shoulder and the funnel-shaped entry, and yoke means having shanks insertable into said recess for locking the yoke means to the junction piece.

4,018,501

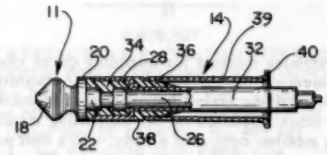
MULTIPLE TERMINAL CONNECTOR PLUG

Robert Edward Maloof, East Greenwich, R.I., assignor to Victor Electric Wire & Cable Corporation, West Warwick, R.I.

Filed Aug. 4, 1975, Ser. No. 601,711

Int. Cl.² H01R 17/18

U.S. Cl. 339—183 **1 Claim**



1. A multiple terminal male connector plug, comprising an outer head pin that defines a first terminal, a first conductor lead joined to said head pin and extending rearwardly thereof, an elongated sleeve formed of a conductive material extending rearwardly of said head pin in coaxial relation and defining a second terminal, a tubular member formed of a conductive material located in surrounding coaxial relation with respect to said sleeve and defining a third terminal, and additional conductor leads joined to said second and third terminals and defining separate circuits therewith, and a body molded onto a portion of said tubular member and locating said terminals in fixed relation relative to each other, portions of the head pin, sleeve and tubular member being exposed to define a continuous plug for being received in a complementary female socket, said first conductor lead extending centrally of said sleeve and tubular member and being secured to said head pin to define an electrical circuit therewith, the other said addi-

tional conductor leads being secured to said sleeve and tubular portion at the rearmost ends thereof and being encapsulated in said molded body, thereby defining separate electrical circuits through said plug, said head pin including a forward contact portion that defines the forwardmost end of said plug and a reduced rear portion, said first conductor lead being joined to said reduced rear portion axially thereof, said sleeve including a forward portion that is spaced rearwardly of the forward contact portion of the head pin and being insulated therefrom and surrounding the reduced rear portion of said head pin and being insulated therefrom, a rearwardly extending portion of said sleeve being integrally joined to the forward portion thereof and enveloping an insulated section of said first conductor lead, an insulator separating the forward end of said tubular member from the forward portion of said sleeve, said molded body projecting between said tubular member and the rearwardly extending portion of said sleeve to provide an insulation therebetween, the forward portion of said sleeve having a cavity formed therein that receives the reduced rear portion of said head pin, said cavity including an annular shoulder spaced rearwardly of said rear portion of said head pin, a second insulator enveloping the reduced rear portion of said head pin in said cavity and extending outwardly of said cavity to space the forwardmost edge of the forward portion of said sleeve from said forward contact portion of said head pin.

4,018,502

TERMINAL BLOCK RETAINING MEMBER

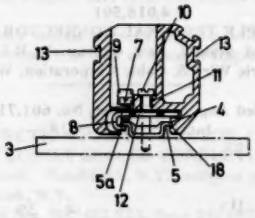
Gottfried Glaesel, Ascona, Switzerland, assignor to Hego Electric G.m.b.H., Spielhof, Switzerland

Filed June 25, 1975, Ser. No. 590,162

Claims priority, application United Kingdom, Oct. 1, 1974, 42548/74

Int. Cl.² H01R 9/16

U.S. Cl. 339—198 GA **7 Claims**



1. A retaining member for mounting on an elongate supporting member having two opposite outwardly directed edges, for retaining against longitudinal movement electrical terminal blocks mounted on the supporting member, which retaining member comprises a body, with a foot portion provided with a pair of recesses facing one another for engaging respective edges of the supporting member, a clamping screw in the body, with its axis generally transverse to the plane of an edge of the supporting member, a clamping member positively engaged by the clamping screw, defining at least one side of a first said recess and capable of being moved by means of the clamping screw toward and away from the other said recess for respectively engaging under and disengaging from one edge of the supporting member when received by its other edge in the other recess, whereby when the clamping member is disengaged the retaining member can be fitted to and removed from the supporting member by movement of the retaining member transversely to the supporting member, the clamping member being slidable in the body toward and away from the other recess and incorporating the first said recess, and the clamping screw being threaded in the clamping member adjacent to the first said recess for sliding the clamping member and clamping the supporting member between the screw tip and the clamping member.

4,018,503

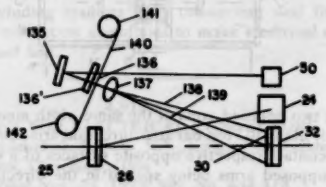
HOLOGRAPHIC SYSTEMS HAVING REFERENCE BEAM CODED HOLOGRAMS

Daniel Silverman, 5969 S. Birmingham Ave., Tulsa, Okla. 74105, and Everett A. Johnson, 15 S. Prospect Ave., Park Ridge, Ill. 60068

Continuation-in-part of Ser. No. 328,883, Feb. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 111,992, Feb. 2, 1971, Pat. No. 3,807,828, which is a continuation of Ser. No. 721,989, April 17, 1968, Pat. No. 3,560,071. This application Jan. 14, 1977, Ser. No. 541,046

Int. Cl.² G03H 1/12, 1/26

U.S. Cl. 350—3.5 **11 Claims**



1. A method of making a hologram comprising the steps of:

a. producing a beam of at least partially coherent light;

b. dividing said light beam into separate angularly displaced reference and object light beams;

c. passing only said reference light beam through a first means to introduce a first unique pattern of intensity variations in said reference light beam;

d. positioning a photosensitive member to intercept at least a portion of the first reference light beam;

e. simultaneously illuminating a first object with the object light beam;

f. simultanously directing at least a portion of the first object-modified light onto the photosensitive member, said object-modified light being sufficiently coherent with respect to the reference light beam to produce an interference pattern on said photosensitive member;

g. passing said reference beam through a second means to introduce a second unique pattern of intensity variations in said reference light beam different from the first unique pattern of intensity variations and to said photosensitive member;

h. illuminating a second object with the object light beam; and

i. simultaneously directing at least a part of the second object modified light onto said photosensitive member to produce in interference pattern, and including the additional step of

j. moving said photosensitive member by a distance d, where $d = D/K$, where K has a value greater than 1, and D is the longitudinal dimension of each interference pattern exposure area on the photosensitive member in the direction of motion of the distance d, between the steps of directing said first and said second object-modified light beams to said photosensitive member.

4,018,504

RETRO-REFLECTIVE MULTIPLE-X OPTICAL SCANNING SYSTEM

Paul S. Wu, and Michael R. Stroll, both of Randolph, N.J., assignors to Sweda International, Inc., Pinebrook, N.J.

Filed May 2, 1975, Ser. No. 574,137

Int. Cl.² G02B 27/17; H01J 3/14

U.S. Cl. 350—7 **12 Claims**

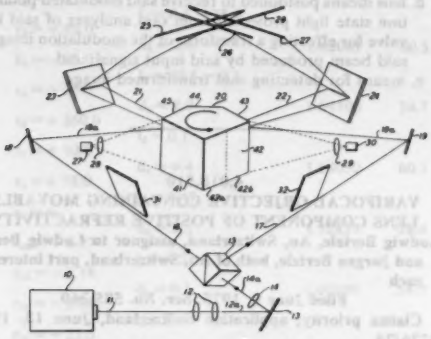
1. Optical scanning apparatus for scanning and sensing information contained on a label-bearing article, comprising:

a light source;

a rotatable member having a reflective surface;

first optical means for directing light from said source to said surface; and

second optical means for directing light reflected from said surface to form a scanning pattern on a predetermined plane;



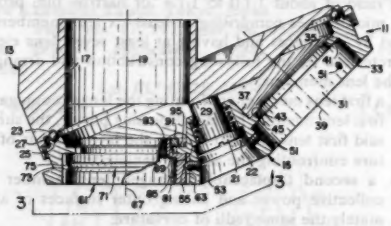
said second optical means comprising fixed reflective means for directing said light by reflection;

said scanning pattern being comprised of a plurality of segments together forming at least one pair of overlapping cross-shaped traces.

4,018,505
OBJECTIVE CENTERING NOSEPIECE

Theodore H. Peck, Irondequoit, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Feb. 24, 1975, Ser. No. 552,675
Int. Cl.² G02B 7/04
U.S. Cl. 350—39 9 Claims



1. Apparatus for supporting optics, such as a microscope objective, and aligning the optical axis of said optics with an axis, said apparatus comprising:

a. support means, said support means including a through opening, said through opening including an inwardly projecting flange having first and second spaced surfaces;

b. an optics supporting cell, said cell including means for supporting said optics, a first shoulder and means for cooperating with a locking means, said cell being received within said through opening with said first shoulder in engagement with one of said first and second spaced surfaces of said inwardly projecting flange;

c. locking means, said locking means engaging said cooperating means and positioned in spaced relation to the other of said first and second spaced surfaces of said inwardly projecting flange;

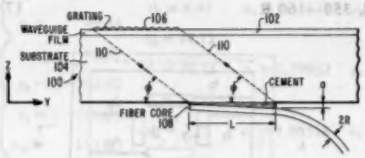
d. resilient, yieldable means, said means being positioned between and in engagement with both said locking means and said other of said first and second spaced surfaces of said inwardly projecting flange to insure engagement between said one of said first and second spaced surfaces of said inwardly projecting flange and said first shoulder; and

e. position adjusting means, said adjusting means being supported by and moveable relative to said support means and engaging said cell to adjust the position of said cell in a direction perpendicular to said axis to align said optical axis of said optics with said axis.

4,018,506
FIBER-OPTIC TO PLANAR-WAVEGUIDE OPTICAL COUPLER

Jacob Meyer Hammer, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,327
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 2 Claims



1. In combination:

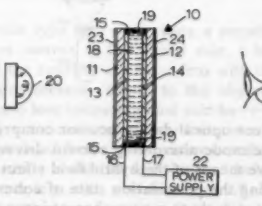
a substrate of a first given index of refraction and of a given thickness supporting on one face thereof a planar optical waveguide film having an index of refraction higher than said first given index of refraction, and

a fiber-optic core of given diameter having a coupling portion of given length situated in proximity to the opposite face of said substrate from said one face thereof, said core having a given index of refraction lower than said first index of refraction for coupling light of a given wavelength from said core to said substrate by phase-matched evanescent fields, said given diameter being sufficiently small relative to said given wavelength to cause coupled light in said substrate to diverge by diffraction to a given width in traveling through the given thickness of said substrate from said opposite face thereof to said one face thereof, said given width and said given length being sufficiently large relative to said given wavelength to provide an aperture at said one face having a size which permits said light in said substrate arriving at said aperture to be further coupled by phase-matched evanescent fields into said film with a substantially plane wavefront.

4,018,507
LIQUID CRYSTAL DEVICE, COMPOSITION THEREFOR, AND METHOD FOR PREPARING THE COMPOSITION

N.V. Vijaya Raghavan, Mountain View, Calif., assignor to American Micro-Systems, Inc., Santa Clara, Calif.

Filed Sept. 5, 1974, Ser. No. 503,241
Int. Cl.² G02F 1/13; C09K 3/34
U.S. Cl. 350—160 LC 16 Claims



1. An electro-optical light-modulating device containing a nematic liquid crystal composition comprising an admixture of 90% to 60% by weight of (A) p-methoxy benzylidene-p-butyl aniline, and 10% to 40% by weight of (B) at least one

fluorinated Schiff base having the general formula X — Ph — HC = N—PH — F, wherein X is an alkoxy group having from 1 to 10 carbon atoms, Ph is phenylene and F is fluorine, and means for applying an electric field to said admixture.

4,018,508

ELECTROCHROMIC DEVICE AND MEDIUM THEREFOR

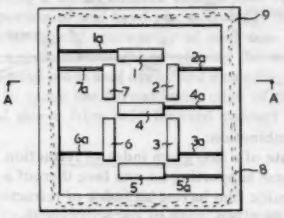
Michael John McDermott; John Graham Allen; Keith Jones, and Peter Gordon Wright, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 14, 1975, Ser. No. 558,362

Claims priority, application United Kingdom, Mar. 15, 1974, 11597/74

Int. Cl.² G02F 1/36

U.S. Cl. 350—160 R **17 Claims**



1. An electrochromic medium comprising an active material, an auxiliary redox system comprising a substantially colourless complex of reversibly oxidisable metallic ions and a complexing agent for the said metallic ions and an inert solvent.

4,018,509

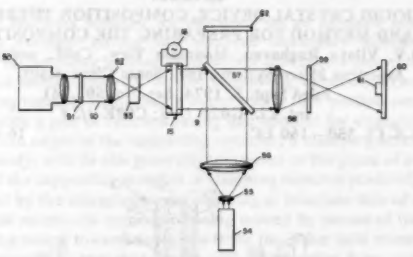
OPTICAL DATA PROCESSING SYSTEM WITH REFLECTIVE LIQUID CRYSTAL LIGHT VALVE

Donald D. Boswell, Granada Hills; Jan Grinberg, Los Angeles; Alexander D. Jacobson, Topanga, and Gary D. Myer, Reseda, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 8, 1976, Ser. No. 664,777

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **10 Claims**



1. A coherent optical data processor comprising:

a. reflective mode alternating current driven liquid crystal light valve means of the hybrid field effect mode type for modulating the polarization state of coherent projection light responsively to a noncoherent input light signal;

b. means for providing a noncoherent input light image signal to the input side of said light valve;

c. means for providing coherent projection light to the output side of said light valve said means comprising a source of polarized light, said light valve means including analyzer means positioned to block the exit from said light valve of light in a first polarization state and to transmit light from said light valve when its polarization state has been modulated to at least one state different from said first state in said light valve;

d. lens means positioned to receive said modulated polarization state light projected from said analyzer of said light valve for effecting a transform of the modulation image in said beam produced by said input signal; and

e. means for detecting said transformed image.

4,018,510

VARIFOCAL OBJECTIVE CONTAINING MOVABLE LENS COMPONENT OF POSITIVE REFRACTIVITY

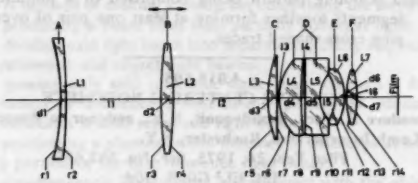
Ludwig Bertele, Au, Switzerland, assignor to Ludwig Bertele and Jurgen Bertele, both of Au, Switzerland, part interest to each

Filed June 9, 1975, Ser. No. 585,360

Claims priority, application Switzerland, June 13, 1974, 8226/74

Int. Cl.² G02B 15/14

U.S. Cl. 350—184 **7 Claims**



1. An objective of variable focal length affording an aperture ratio of about 1:1.0 to 1:1.4 for narrow film projectors and microscopes comprising at least six lens members separated by air spaces and having at least seven lens elements, charcterized by the following construction and arrangement of the lens members:

a. a first lens member confronting the longer conjugate, said first lens member having dispersing power, the surface of said first lens member having the larger radius of curvature confronting the shorter conjugate;

b. a second displaceably arranged lens member having collective power and having outer surfaces of approximately the same radii of curvature;

c. a third collecting lens member having differently curved outer surfaces, the surface confronting the shorter conjugate having the larger radius of curvature, said third collecting lens member being separated from the lens surface of a following fourth lens member by a small air space;

d. a fourth dispersing lens member having an axial thickness and comprising at least one collecting lens element and a dispersing lens element, said collecting lens element having a convex curved lens surface confronting the longer conjugate, said dispersing lens element having a concave curved surface confronting the shorter conjugate, the convex curved lens surface of the collecting lens member having a larger radius of curvature than the radius of curvature of the concave curved surface confronting the shorter conjugate;

e. a fifth lens member comprising a meniscus convex to the shorter conjugate, said meniscus possessing an axial thickness which is smaller than one-half of the radius of curvature of the convex lens surface thereof confronting the shorter conjugate and also smaller than the axial thickness of the fourth lens member: and

f. a sixth lens member having collective power and having convex outer surfaces: and

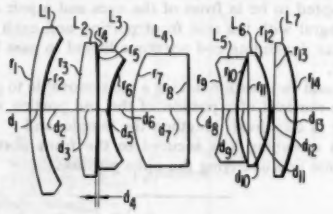
			n_d	V_d
	$r_1 = -45.98$			
L_1		$d_1 = 1.0$	1.53172	48.8
	$r_2 = -127.43$			
		$l_1 = 0.3 - 38.5$		
	$r_3 = +95.0$			
L_2		$d_2 = 2.6$	1.62041	60.3
	$r_4 = -95.0$			
		$l_2 = 38.5 - 0.3$		
	$r_5 = +26.0$			
L_3		$d_3 = 2.0$	1.69100	54.7
	$r_6 = +260.0$			
		$l_3 = 0.1$		
	$r_7 = +10.8$			
L_4		$d_4 = 4.4$	1.64050	60.1
	$r_8 = +78.0$			
		$l_4 = 0.47$		
	$r_9 = \infty$			
L_5		$d_5 = 3.0$	1.72825	28.4
	$r_{10} = +6.97$			
		$l_5 = 4.5$		
	$r_{11} = -8.18$			
L_6		$d_6 = 0.5$	1.69100	54.7
	$r_{12} = -8.80$			
		$l_6 = 0.1$		
	$r_{13} = +23.0$			
L_7		$d_7 = 2.2$	1.72875	54.2
	$r_{14} = -19.7$			

wherein the symbol L designates the individual lens elements of the lens members; the symbol r designates the different radii of curvature of the lens elements; the symbol d designates the different thickness of the lens elements the symbol l designates the different air spaces; the symbol n_d designates the refractive index for the helium line; and the symbol v_d designates the Abbe number.

4,018,511
PHOTOGRAPHIC WIDE ANGLE LENS

Yasuo Takahashi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,595
Claims priority, application Japan, Nov. 18, 1974, 49-132506
Int. Cl.² G02B 13/04
U.S. Cl. 350—214 1 Claim



1. A retro-focus type wide angle lens system composed of seven lenses in two groups, the first group consisting of a first negative meniscus lens L_1 convex to the object, a second positive lens L_2, and a third negative meniscus lens L_3 convex to the object, and the second group consisting of a fourth positive lens L_4, a fifth negative lens L_5, a sixth positive meniscus lens L_6, and a seventh positive lens L_7, wherein the focal lengths, the radii of curvature r_1 to r_{14}, the lens thickness or distance d_1 to d_{13}, the refractive indices n_1 to n_7, and the Abbe numbers ν_1 to ν_7 for the lenses L_1 to L_7 satisfy the following conditions:

$F = 100$, where F is the focal length of the whole system,

$F_{1,2}$=653.59, where $F_{1,2}$ is the combined focal length of lenses L_1 and L_2,

$F_{1,2,3}$= −96.15, where $F_{1,2,3}$ is the combined focal length of lenses L_1 through L_3, and

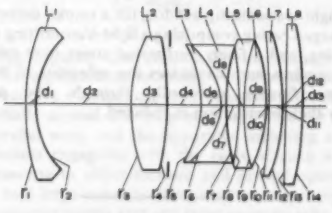
$F_{1,2,3,4}$= 141.84, where $F_{1,2,3,4}$ is the combined focal length of lenses L_1–L_4

Lens	Radius of Curvature r	Lens Thickness or Distance d	Refractive Index n	Abbe No. ν
L_1	$r_1 = 161.15$	$d_1 = 6.15$	$n_1 = 1.60738$	$\nu_1 = 56.8$
	$r_2 = 72.55$	$d_2 = 19.93$		
L_2	$r_3 = 186.64$	$d_3 = 10.50$	$n_2 = 1.71300$	$\nu_2 = 53.9$
	$r_4 = -402.24$	$d_4 = 0.59$		
L_3	$r_5 = 1834.76$	$d_5 = 6.41$	$n_3 = 1.56873$	$\nu_3 = 63.1$
	$r_6 = 49.54$	$d_6 = 14.12$		
L_4	$r_7 = 65.07$	$d_7 = 30.23$	$n_4 = 1.79952$	$\nu_4 = 42.2$
	$r_8 = -362.02$	$d_8 = 10.91$		
L_5	$r_9 = -69.86$	$d_9 = 7.23$	$n_5 = 1.80518$	$\nu_5 = 25.4$
	$r_{10} = 152.00$	$d_{10} = 6.69$		
L_6	$r_{11} = -235.10$	$d_{11} = 11.40$	$n_6 = 1.73400$	$\nu_6 = 51.5$
	$r_{12} = -60.16$	$d_{12} = 2.00$		
L_7	$r_{13} = 381.07$	$d_{13} = 12.45$	$n_7 = 1.64000$	$\nu_7 = 60.2$
	$r_{14} = -105.28$			

4,018,512
RETROFOCUS TYPE LENS

Yutaka Sakai, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Continuation-in-part of Ser. No. 515,221, Oct. 16, 1974, abandoned. This application Oct. 24, 1975, Ser. No. 625,778
Claims priority, application Japan, Nov. 9, 1973, 48-126655
Int. Cl.² G02B 13/04
U.S. Cl. 350—215 1 Claim



1. A retrofocus type lens comprising a negative meniscus lens with a face convex to the object side, a biconvex lens located behind the negative meniscus lens with the surface of greater curvature thereof convex to the object side, a cemented biconcave lens located behind said biconvex lens with the surface of greater curvature thereof concave to the object side and the cemented face thereof convex to the image side, a cemented positive meniscus lens located behind said cemented biconcave lens with a surface thereof convex to the image side, a positive meniscus lens located behind said cemented positive meniscus lens with a face thereof convex to the image side, and a positive lens located behind said positive meniscus lens, wherein the conditions;

$0.45f < d2 < 0.75f$,

$$0.33 < \frac{r3}{|r4|} < 0.6$$

$$0.05 < N3-N4 < 0.13 \text{ and}$$

$$-0.45f < r6 < -0.33f$$

are satisfied, where f is the focal length of the lens system as a whole, $d2$ is the air separation between the negative meniscus lens and the biconvex lens, $r3$ is the radius of curvature of the front face of the biconvex lens, $r4$ is the radius of curvature of the rear face of the biconvex lens, N3 is the refractive index of the front lens element of the cemented biconcave lens, N4 is the refractive index of the rear lens element of the cemented biconcave lens, and $r6$ is the radius of curvature of the cemented face of the cemented biconcave lens.

4,018,513

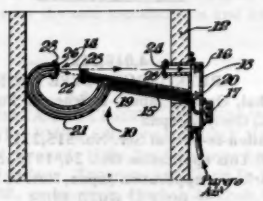
OPTICAL WINDOW USED IN DEVICE FOR MONITORING CLARITY OF A FLUID

Jan Boeke, P.O. Box 2511, Chapel Hill, N.C. 27514

Division of Ser. No. 455,558, March 28, 1974, Pat. No. 3,954,342. This application Mar. 26, 1976, Ser. No. 670,555

Int. Cl.² G01N *21/12*

U.S. Cl. 350—319 7 Claims



1. A light-transmitting window for a smoke detector having an air purged casing comprising a light-transmitting opening in said casing, and a finely perforated cover over said opening which equalizes and maximizes the velocities of the purging airstreams flowing outwardly through said perforation whereby their obstruction is reduced.

4,018,514

APPARATUS FOR RETINAL PHOTOGRAPHY

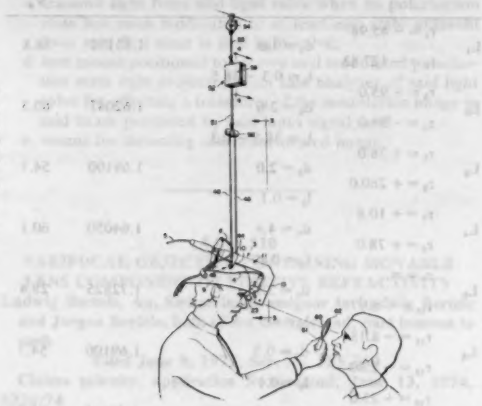
William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 25, 1975, Ser. No. 616,599

Int. Cl.² A61B *3/14*

U.S. Cl. 351—7 9 Claims

1. Apparatus for retinal photography, comprising headgear, said headgear comprising a helmet adapted to be worn on the head of the photographer, an indirect opthalmoscope mounted on said helmet, a camera mounted on said helmet, means for optically coupling said camera to said ophthalmoscope to photograph a region of the field seen through said ophthalmoscope, and suspension means for partially suspending said headgear from an overhead support for universal



movement in response to a force exerted by the photographer equal to a minor portion of the weight of said headgear.

4,018,515

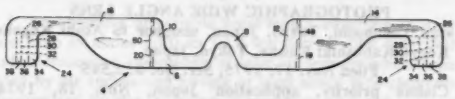
SUNGLASSES

Alexander Derkas, Phoenixville, Pa., assignor to American Polarizers, Inc., Reading, Pa.

Filed Mar. 6, 1975, Ser. No. 556,016

Int. Cl.² G02C *7/12, 5/20*

U.S. Cl. 351—47 6 Claims



1. Sunglasses comprising:

a unitary frame of flexible material having a front portion adapted to be supported on the nose and open portions adapted to be in front of the eyes and a pair of temples integral with the said front portion and each having an outer depending end portion adapted to pass behind the ear,

each said end portion having a tab removable to provide for the removal of a portion of the end portion nearest the ear to effectively lengthen the temple, and

a sun screening lens secured to the front portion of the frame and overlying the open portions.

4,018,516

SPECTACLE FRAME

Tohyama Hideaki, 4-20-7 Nakaochiai, Shinjuku, Tokyo, and Gotoh Bonpei, 1-25-3 Honkomagome, Bunkyo, Tokyo, both of Japan

Filed Oct. 24, 1975, Ser. No. 625,471

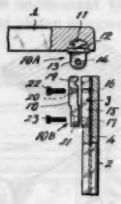
Claims priority, application Japan, June 10, 1975, 50-77593[U]

Int. Cl.² G02C *5/14*

U.S. Cl. 351—121 2 Claims

1. A spectacle frame comprising a lens receiving body, two temples pivotally and adjustably connected to the opposite ends of said lens receiving body and an articulate connecting device for pivotally connecting between each end of said lens receiving body and each of said temples, characterized by that said articulate connecting device comprises a first half portion associated with said lens receiving body and a second half

portion associated with said temple, said first half portion including a base plate integrally having spaced legs extending from one side of said base plate and embedded in said lens receiving body, spaced and opposite brackets extending from the other side of said base plate and a pivot pin extending between said brackets; and said second half portion including a washer member received in a recess in said temple and having at least one threaded through hole, an adjustable washer holding-down member for holding said washer member on said temple and having at least one elongated plain hole



having the elongated dimension greater than the diameter of said threaded hole in the washer member and in communication with the threaded hole, said washer holding-down member further including a recess receiving said pivot pin therein, and threaded fastening means fastening the two members to said temple, said fastening means being in threaded engagement with said threaded hole in the washer member and adjustably extending through said plain hole in the holding-down member for permitting rotation and adjustment of the lens receiving body with respect to said temple.

4,018,517

MOTION PICTURE CAMERA

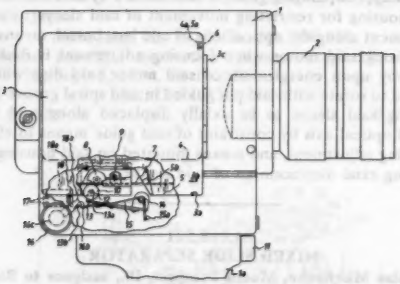
Peter Ungnadner, Unterhaching, and Wolfgang Geisslinger, Munich, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 8, 1975, Ser. No. 575,634

Claims priority, application Germany, May 10, 1974, 2422716

Int. Cl.² G03B 23/02

U.S. Cl. 352—72 **6 Claims**



1. In a motion picture camera, particularly in a motion picture camera for **8-millimeter** film, a combination comprising a bousing having a chamber for reception of relatively small and relatively large film containers whereby a portion of said chamber remains unoccupied when said chamber receives a large container; a blocking device movably mounted in said housing and extending into said portion of said chamber so that a large container moves said device from a first to a second position when such large container is properly inserted into said chamber; a sound recording mechanism mounted in said housing and having a portion movable from a retracted position to an extended position of engagement with film in a large container in said chamber; control means for effecting or permitting the movement of said portion of said mechanism from said retracted to said extended position in response to movement of said blocking device from said first to said second position, comprising a control member which is movable along a predetermined path between operative and inoperative positions to thereby respectively effect the movement of said portion of said mechanism to said extended and retracted positions, said blocking device extending into said path to thereby prevent the movement of said control member to said operative position when said device assumes said first position thereof, means for permanently biasing said portion of said mechanism to said extended position, and means for moving said portion of said mechanism to said retracted position through the medium of said control member, including a handgrip portion accessible at the exterior of said housing and a carrier for said last mentioned portion, said carrier being biased by said biasing means and being movable against the opposition of said biasing means by said handgrip means through the medium of said control member; and a friction clutch interposed between said handgrip means and said control member so that said handgrip means is movable by hand with and independently of said control member.

4,018,518

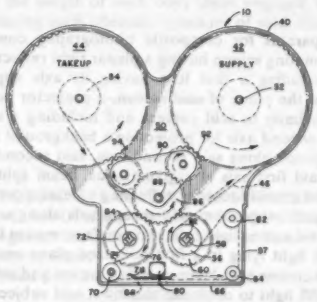
LARGE CAPACITY FILM CASSETTE

Joseph H. Wright, Marblehead, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 10, 1974, Ser. No. 531,340

Int. Cl.³ G03B 23/02

U.S. Cl. 352—78 R **7 Claims**



1. A large capacity film cassette for use with projection apparatus having a cassette-receiving well of a size and configuration to receive a limited capacity cassette which includes a pair of radially spaced film strip reels mounted for rotation around parallel axes, and the apparatus including a pair of drive sprockets engagable with the reels of such a limited capacity cassette to effect forward and rewind operation of said reels, said large capacity film cassette comprising:

a large capacity supply reel and large capacity take-up reel;

a housing enclosing and supporting said supply reel and take-up reel in radially spaced relation for rotation around parallel axes, said housing having a projector mounting tongue portion of a size and shape to be received in the receiving well of the projecting apparatus;

means within said housing for guiding a film strip between said supply reel and take-up reel and through an operative projection station within said tongue portion; and

transmission means within said housing for coupling the drive sprockets of the projection apparatus with either said supply reel or said take-up reel while said tongue portion is received in the well, said transmission means including means shiftable between engagement with either said take-up reel or said supply reel in accordance with the direction of rotation of the drive sprockets to effect driving coupling of the drive sprockets respectively

therewith during forward and rewind driving operations, and said tranmission means comprising a pair of shiftable gears alternately engagable with either said supply reel or said take-up reel, and rocker means for supporting said shiftable gears so that one of said pair of gears engages said take-up reel for rotation thereof to take up the film strip during forward operation and the other of said pair of gears engages said supply reel for rotation thereof during rewind operation of the projection apparatus.

4,018,519

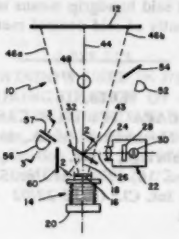
COMPOSITE PHOTOGRAPHY APPARATUS AND METHOD UTILIZING A POLARIZING BEAM SPLITTING UNIT

Roy A. Clapp, 10522 Foley Blvd., Coon Rapids, Minn. 55433

Filed Aug. 18, 1975, Ser. No. 605,596

Int. Cl.² A63J *5/00*; **G03B** *21/26, 35/00, 15/02*

U.S. Cl. 352—89 **18 Claims**



1. Apparatus for composite photography comprising an autocollimating screen having a planar right reflecting surface facing including a first lens having its axis approximately normal to the plane of said screen, a projector positioned in close proximity to said camera and including a second lens having a second axis for projecting a background image from said projector along said second axis, said second axis intersecting said first axis at a given locus, beam splitting means positioned at said locus for reflecting at least a portion of said background image from said second axis along said first axis toward said screen light reflecting surface, means for directing polarized light lying in a first polarized plane onto a subject located between said beam splitting means and said screen to provide fill light to minimize shadows, said subject dispersing the light striking it into various planes, and polarizing means between said beam splitting means and said camera for transmitting through said first lens to said camera only light reflected from said screen and said subject lying in a second polarized plane generally perpendicular to said first plane of polarized light directed onto said subject.

4,018,520

PROJECTOR FOCUSING MECHANISM

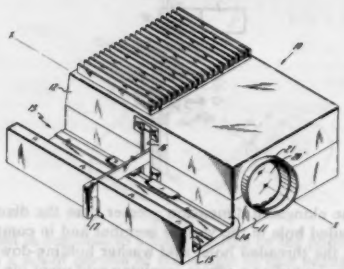
Fortunato Aste, Sint Niklaas, Belgium, assignor to GAF Corporation, New York, N.Y.

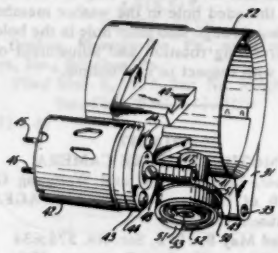
Filed Apr. 15, 1975, Ser. No. 568,155

Int. Cl.² G03B *3/00, 21/14*; **G02B** *7/02*

U.S. Cl. 353—101 **4 Claims**

1. In a transparency projector, the combination comprising a housing, a projection gate within said housing for supporting therein a transparency having an image to be projected upon a remote viewing screen, a source of illumination within the housing, optical means including an objective lens carried in a lens barrel for projecting said image, a lens barrel carrier formed by a cylindrical sleeve mounted for axial movement within said housing, said lens barrel being axially moveable within said sleeve, and means for causing axial movement of said sleeve and thereby said lens barrel to effect focusing adjustment of said transparency image on said remote viewing screen, said means for causing axial movement of said sleeve comprising a reversible electric motor mounted on flange means integral with said sleeve, a driving element carried on the output shaft of said reversible electric motor, a single disc rotatably mounted on said sleeve in driving engagement with said driving element for causing rotation of said disc upon energization of said motor, said disc having a first flat surface facing an external surface of said sleeve and a second flat surface facing away from said external surface of said sleeve, a spiral grooved guideway arranged on said second flat surface of said disc, a stationary pin secured at one end thereof to the





interior of said housing and extending toward said sleeve, the distal end of said pin being engaged in said spiral grooved guideway, cooperating guide means carried by said sleeve and said housing for restricting movement of said sleeve to axial movement along the optical axis of said lens barrel, means for energizing said motor when focusing adjustment is desired, whereby upon energization of said motor said disc will be caused to rotate with said pin guided in said spiral groove thus causing said sleeve to be axially displaced along said lens barrel optical axis by constraint of said guide means to effect focusing adjustment, and means mounted on said housing for limiting axial displacement of said sleeve.

4,018,521

MIXED SLIDE SEPARATOR

Nicholas Mischenko, Mount Prospect, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,264

Int. Cl.² G03B *23/00, 23/02*

U.S. Cl. 353—104 **1 Claim**

1. Improvements in a slide projector having a slide entry station in a housing for receiving slides from a vertical stack of intermixed thick and thin slides, and having a platen having a plurality of apertures for accepting in each aperture a slide from the bottom of the stack at the entry station and transporting the slide in the aperture to another station, the improvement comprising:

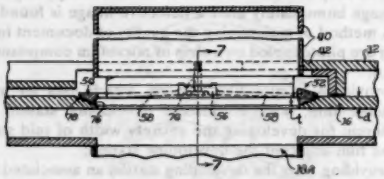
tapered wedge surfaces on said platen at leading and trailing edges of said slide accepting aperture in said platen, said surfaces being inclined constantly from a thickness less

than the thickness of said platen which thickness is less than the thickness of a thin slide to the thickness of said platen which thickness is slightly greater than the thickness of a thick slide; and

a separator member fixed in said housing at said entry station, including:

stripper means arranged as leading and trailing members extending along the width of said aperture relative to said platen;

an arcuate inner surface on said stripper means having a depth for engaging said upper slide so as to preclude said upper slide from movement from said station as said lower slide in said platen is moved from alignment in said stack;



a tapered surface on the bottom of said stripper means angled from said inner surface and having an angle substantially complementary to the incline of said tapered wedge surface of said platen for engaging with said tapered wedge on said platen for lifting the trailing of said stripper means onto said platen as said platen moves; and

yieldable arms biasing said stripper means toward said platen, and supporting said stripper means for yieldable movement away from said platen;

whereby an upper slide above a single lower slide accepted in the apparatus of said platen is prevented from moving relative to said entry station by said leading stripper means when said platen is moved to displace said lower slide in said aperture from said station, whether said slides are either thick or thin slides.

4,018,522

COLOR ELECTROPHOTOGRAPHIC COPYING MACHINE

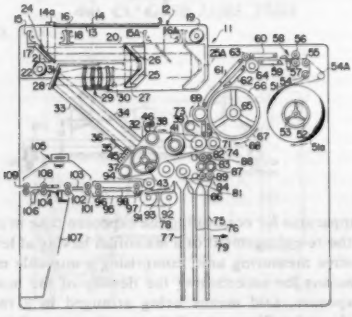
Nobuo Kasahara, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan

Filed Aug. 22, 1975, Ser. No. 606,980

Claims priority, application Japan, Aug. 29, 1974, 49-99170; Sept. 3, 1974, 49-101056

Int. Cl.² G03G *15/01*

U.S. Cl. 355—4 9 Claims



1. A color electrophotographic copying machine comprising

a. a reciprocally rotatable drum;

b. means for supplying a copy sheet to the drum;

c. a roller disposed at a fixed position and maintained in rolling contact with the peripheral surface of said drum, for holding a portion of the length of the copy sheet between said roller and said drum so that said sheet is carried by said drum;

d. means operable to successively form a plurality of electrostatic latent images, corresponding to respective selected color separation images, on the copy sheet carried by the drum, each latent image being formed during a respective rotation of the drum in a first direction;

e. means disposed adjacent said drum for successively developing each electrostatic image with a respective toner developer which is associated with the corresponding color separation image, said developing means being adjustable to bring the respective toner developers successively into receiving relation with a copy sheet having a portion of its length held between said drum and said roller, but remaining stationary during each developing operation;

f. means operable to guide a selected free end of the copy sheet carried by said drum away from the peripheral surface of said drum for feeding of the copy sheet into the then stationary developing means subsequent to the formation of the electrostatic latent image during each such respective rotation of the drum in said first direction; and

g. means operable to treat that surface of each copy sheet which has undergone developing by said developing means, in preparation for the formation of the next electrostatic latent image thereon, during respective rotations of said drum in a second direction opposite to said first direction, said drum rotating alternately in said first and second directions with said roller maintaining said portion of the length of each copy sheet engaged with said drum during such alternate rotations of said drum.

4,018,523

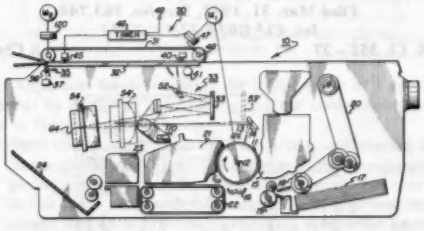
REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT

Edwin L. Hughes, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed July 24, 1975, Ser. No. 598,612

Int. Cl.² G03G *15/30*

U.S. Cl. 355—8 22 Claims



1. A reproducing apparatus for forming multiple copies of a document in a copying run, said apparatus including:

a moving photosensitive surface;

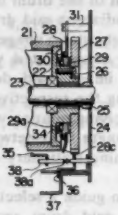
means for forming the first copy of said document in said run while said document is moving in synchronism with said photosensitive surface; and

means automatically responsive to said first copy forming means for forming at least one additional copy of said document in said run while said document is held stationary.

4,018,524
CONSTRUCTION FOR USE WITH AN ELECTROPHOTOGRAPHIC COPYING MACHINE OF WET DEVELOPING TYPE

Tatsuo Tani formerly Nishikawa, and Kenzo Ariyama, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Japan

Filed Dec. 10, 1975, Ser. No. 639,449
Claims priority, application Japan, Dec. 29, 1974, 50-338
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 **14 Claims**



1. A construction for preventing a scattering of liquid applied to the peripheral surface of a rotating photosensitive member beyond the lateral ends thereof in an electrophotographic copying machine of the wet developing type comprising:

a. end plate means liquid-tightly secured to an end of said photosensitive member and having a boss extending outwardly and concentrically with the axis of rotation of said member,

b. support means rotatably mounted on said boss,

c. means for liquid-tightly sealing between said boss and said support means,

d. a flow guide member secured to said support means and spaced apart from the end surface of said photosensitive member for guiding liquid from the peripheral surface of said photosensitive member to flow down therealong.

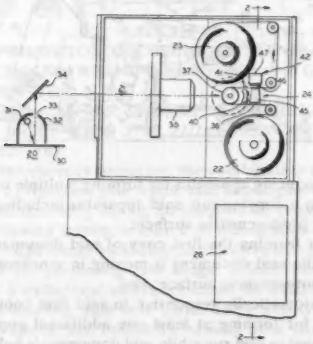
e. means for preventing said guide member from rotating with said photosensitive member to thereby maintain said guide member stationary, and

f. reservoir means disposed beneath said guide member for receiving liquid flowing down along said guide member.

4,018,525
INSTANT IMAGE FILM CAMERA WITH INSPECTION STATION

Milan A. Broderick, Riverwoods; Robert F. Porazinski, and Eugene V. Mateja, both of Norridge, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Mar. 31, 1975, Ser. No. 563,744
Int. Cl.² G03B 27/32, 27/52
U.S. Cl. 355—27 **8 Claims**



1. A microfilm camera for using a strip of instant image film, said camera comprising a film supply means, a take-up means, and means for causing said strip of film to travel over a path from said supply means to said take-up means, at least one instant developing station means disposed adjacent said film for developing across the entire width of the strip of film in the area adjacent said developing station, means comprising a read-out optical system positioned in the path followed by the film as it travels away from said developing station and through the camera to said takeup means, and desensitizing means for desensitizing the strip film thereof across the entire width in the area adjacent said desensitizing means and for simultaneously projecting the image which was instantly formed on the film through the read-out optical system and onto a display screen, whereby an operator may watch the images as they are formed on the film and recopy any defective image immediately after a defective image is found.

6. A method of maintaining the quality of document images as they are photocopied on a strip of microfilm comprising the steps of:

a. providing a microfilm camera, which uses an instant image film, with an instant developing station built therein for developing the entirety width of said strip of the film adjacent the developing station;

b. providing after the developing station an associated read-out optical system, positioned along a path which the film follows as it travels through the camera;

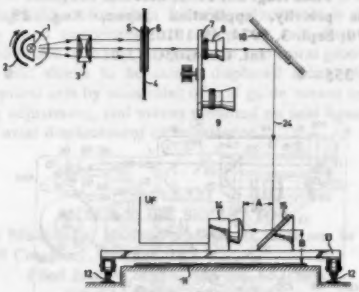
c. projecting an image formed at said developing station as the film develops through a secondary optical system in said camera and onto a display screen, and

d. stopping the camera if an inferior image is detected as it is formed on the film, and of recopying the image immediately, whereby all images are properly recorded on the microfilm.

4,018,526
METHOD OF AND APPARATUS FOR CONTROLLING THE EXPOSURE TIME IN AN APPARATUS FOR THE RE-ENLARGEMENT OF MICROFILMS

Herbert Schroter, Taunusstein, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Aug. 12, 1975, Ser. No. 604,059
Claims priority, application Germany, Aug. 16, 1974, 2439308
Int. Cl.² G03B 27/78
U.S. Cl. 355—68 **6 Claims**



2. An apparatus for controlling the exposure time in apparatuses for the re-enlargement of a microfilm having at least one light-sensitive measuring unit, comprising a movable measuring unit means for ascertaining the density of the microfilm during exposure, said means being arranged in a ray path between the microfilm and a light-sensitive recording material,

discriminator means which selects the measured signals of the light-sensitive measuring unit means, corresponding to an extreme value of the density of the microfilm,

and means for controlling the exposure time according to the signal coming from the discriminator means.

4,018,527

APPARATUS FOR CONTROLLING THE MOVEMENTS OF PRINTING FILTERS

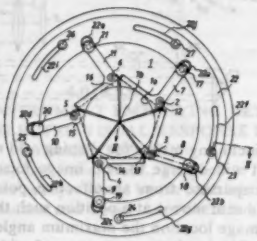
Siegfried Bartel, Gauting; Bernd Payrhammer, and Johann Würf, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 10, 1975, Ser. No. 557,074

Claims priority, application Germany, Mar. 9, 1974, 2411301

Int. Cl.² G03B 27/76

U.S. Cl. 355—71 **25 Claims**



1. Apparatus for continuously coloring a light beam, particularly in a photographic printer wherein a beam of printing light passes in a predetermined direction along a predetermined path toward a plane wherein the beam impinges on photosensitive material, comprising a plurality of sets each composed of a plurality of discrete filters, said sets being disposed one behind the other, as considered in said direction, and the filters of each set being movable transversely of said path to and from inner end positions in which such filters extend at least substantially across the entire path; and discrete actuating means for each of said sets of filters, each of said actuating means comprising a device for simultaneously moving all filters of the respective set toward and away from said inner end positions.

4,018,528

PHOTOMECHANICAL COLOR PRINTING REGISTRATION

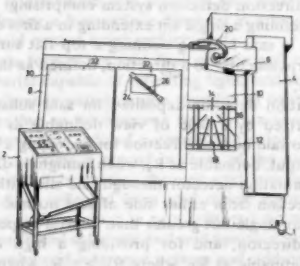
Richard John Dennis, Southport, England, assignor to John Dennis (Graphics) Limited, Liverpool, England

Continuation of Ser. No. 314,938, Dec. 14, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,428

Claims priority, application United Kingdom, Dec. 17, 1971, 58614

Int. Cl.² G03B 23/02, 27/08

U.S. Cl. 355—77 **5 Claims**



1. The method of using positional electronic recording means for registration of color separations for use in photomechanical color printing of illustrations comprising the steps of:

1. providing a set of color separations for each illustration with registration means for each set being disposed on each separation outwardly of an image area thereon;
2. positioning one of the color separations of a set in a registered position according to a layout on a first stable transparent assembly foil which itself is located in a registered position;
3. positioning each of the remainder of the color separations of the set in a predetermined storage position;
4. recording by said electronic means the positional coordinates of the predetermined storage position for the remainder of the color separations;
5. recording by said electronic means the positional coordinates of said one color separation using the registration means of said one color separation on its assembly foil;
6. replacing in the registered position of the first assembly foil a second stable transparent assembly foil;
7. using the recorded positional coordinates of the first of the set of color separations and the position of storage of the remainder of said set for automatically transferring another of the set of color separations from the position of storage to a position on the second assembly foil which is in registration with the corresponding position of the first of said set on said first assembly foil, and
8. repeating steps 6 and 7 for each of the remaining color separations in the set.

4,018,529

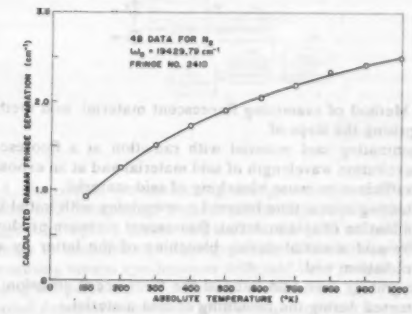
SPECTROSCOPIC TEMPERATURE MEASUREMENT

Joseph J. Barrett, Morris Plains, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 478,405, June 11, 1974, Pat. No. 3,909,132. This application June 5, 1975, Ser. No. 584,085

Int. Cl.² G01J 5/60, 3/44

U.S. Cl. 356—45 **18 Claims**



1. Apparatus for determining the temperature of a gaseous material by analyzing light having spectral components periodic in frequency, comprising:

a. light conditioning means for collecting, collimating and transmitting said light; light for selectively separating periodic spectra therefrom and transmitting said spectra in the form of a detectable signal, said interferometric means having interference-producing means for providing a plurality of transmission windows regularly spaced in frequency, the frequency spacing between adjacent windows being adjusted to depart from an odd integral submultiple, n, of the frequency difference between adjacent spectral components of the periodic spectrum of said gaseous material, said odd integral submultiple being at least three so as to produce a split-fringe containing first and second branches of the components, and scanning means for causing the transmission peaks for adjacent nth orders to substantially coincide with the spectral lines of either branch of the components, whereby each branch of

said split-fringe is derived from a plurality of periodic spectral lines and has an integrated intensity substantially equal to their sum;

c. signal conditioning means for measuring the frequency difference between preselected portions of each of said branches; and

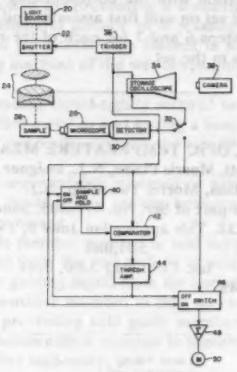
d. detecting means for indicating and recording the frequency difference between said preselected portions of the branches, said frequency difference between said preselected portions correlating with the temperature of said gaseous material.

4,018,530

FLUORESCENCE SPECTROMETRY EMPLOYING EXCITATION OF BLEACHING INTENSITY

Tomas Hirschfeld, Framingham, Mass., assignor to Block Engineering, Inc., Cambridge, Mass.

Filed Nov. 18, 1975, Ser. No. 633,010
Int. Cl.² G01J 3/30
U.S. Cl. 356—85 **8 Claims**



1. Method of examining fluorescent material, said method comprising the steps of

illuminating said material with radiation at a fluorescent excitation wavelength of said material and at an exposure sufficient to cause bleaching of said material;

detecting over a time interval commencing with initial illumination of said material, fluorescent emission produced by said material during bleaching of the latter by said radiation; and

integrating over said interval the fluorescent emission detected during the bleaching of said material.

4,018,531

SPECKLE PATTERN INTERFEROMETER

Jack Albert Leendertz, Bristol, England, assignor to National Research Development Corporation, London, England

Filed Mar. 3, 1975, Ser. No. 554,698
Claims priority, application United Kingdom, Mar. 5, 1974, 9794/74
Int. Cl.² G01B 9/02
U.S. Cl. 356—109 **8 Claims**

1. An interferometer comprising:

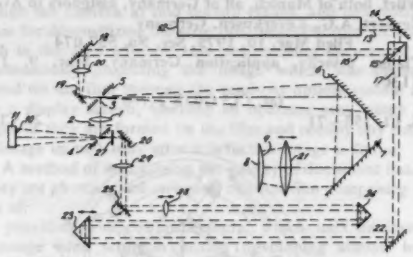
a planar mirror having a small aperture formed therein;

an optical imaging system disposed optically between an object location and an image location with said mirror disposed in the optical path between said imaging system and said image location, whereby light scattered from a surface disposed at said object location will be imaged by said imaging system at said image location after reflection at said mirror;

means for producing from a beam of coherent light directed into the interferometer separate object and reference beams;

means for directing said object beam to said object location to illuminate any surface disposed at said object location; and

means for directing said reference beam to said image loca-



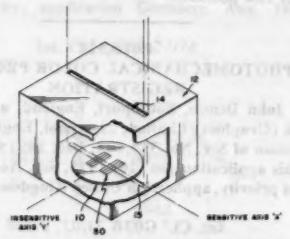
tion, including means for shaping said reference beam so that it will diverge to said image location through said small aperture from an effective point source located behind said mirror at a position such that at any point of said image location the maximum angle between a ray of said reference beam and a ray of said imaged scattered light will be not greater than the maximum angle between different rays of said imaged scattered light.

4,018,532

SUN DIRECTION DETECTION SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Louis F. Schmidt, Altadena, and George D. Pace, Jr., Sierra Madre, both of Calif.

Filed Sept. 24, 1975, Ser. No. 616,472
Int. Cl.² G01B 11/26
U.S. Cl. 356—141 **14 Claims**



10. A sun direction detection system comprising:

a housing defining a single slit extending in a first direction;

a substrate in said housing defining a top flat surface in a plane perpendicular to a direction, defined as the normal direction;

an illumination detector deposited on said substrate and characterized by a field of view definable as $\pm Z°$ with respect to said normal direction for providing a low resistance output, definable as R_s, when sunlight is directed to said illumination detector through said slit, with the sunlight direction from either side of said normal direction forming an angle not greater than Z° with respect to said normal directon, and for providing a high resistance output definable as R_A, where $R_A >> R_s$ when the sunlight is directed to said illumination detector through said slit, with the sunlight direction forming an angle greater than Z° with respect to said normal direction; and

a sun angle detector deposited on said substrate and charac-

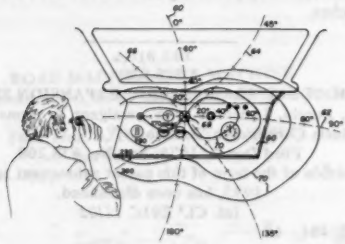
terized by a field of view definable as ±W° with respect to said normal direction for providing an output which is a function of the direction of the sunlight directed thereto through said slit with respect to said normal direction when the angle of the sunlight direction with respect to said normal direction is not greater than W°, with the field of view of said sun angle detector being greater than the illumination detector field of view.

4,018,533

OPTICAL INSTRUMENT EMPLOYING RETICLE HAVING PRESELECTED VISUAL RESPONSE PATTERN FORMED THEREON

Richard F. Haines, Los Altos, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 665,032
Int. Cl.² G02B 27/32
U.S. Cl. 356—171 12 Claims



1. An optical instrument for use in locating indicator lights on a work surface comprising:

a generally tubular housing having first and second ends;

a lens mounted within said housing proximate said first end, said lens including an inner surface coated with a material that is capable of reflecting a portion of the light incident thereon;

a plate mounted within said housing proximate said second end and having a central aperture;

a generally transparent substrate disposed within said housing intermediate said lens and said plate, said substrate including a first surface disposed in a facing relationship to said coated inner surface; and

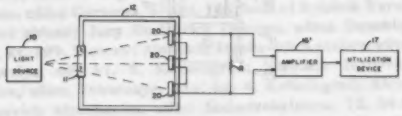
a reticle formed on said first surface and comprised of a material capable of reflecting light, said reticle including a reference pattern and a plurality of contours each representing an iso-response time for an average viewer to respond to a light of a preselected color, whereby when said aperture is placed in front of the eye of a viewer, ambient light passing through said lens and sriking said reticle is reflected from said reticle against said coated inner surface which in turn reflects a portion of the light through said substrate and said aperture into the eye, and whereby said reference pattern and said contours appear to be projected upon the work surface so as to permit the viewer to locate indicator lights on the work surface such that the lights are capable of being detected and hence responded to within a desired response time.

4,018,534

AEROSOL AVERAGE-DENSITY DETERMINING SYSTEM

Lawrence B. Thorn, and David R. Dreitzler, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 21, 1975, Ser. No. 579,657
Int. Cl.² G01N 21/22
U.S. Cl. 356—201 1 Claim



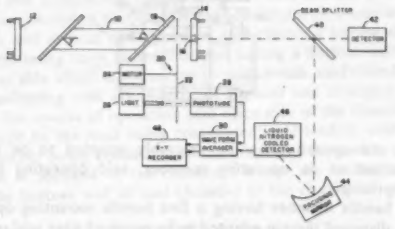
1. An aerosol average density determining system including a single light source for providing light along plural paths through said aerosol; and means for detecting light from said plural paths, said means for detecting includes a respective photosensitive means for each of said paths, said photosensitive means having outputs connected in series.

4,018,535

DEVICE FOR MEASURING ENERGY TRANSFER RATES DURING LASING

Charles M. Cason, III, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 28, 1975, Ser. No. 626,584
Int. Cl.² G01J 1/42; H01S 3/00
U.S. Cl. 356—218 4 Claims



1. Apparatus for measuring energy transfer rates during lasing and comprising: a gas laser having output optical energy, interrupting means disposed in the path of said output energy to establish an output pulse repetition rate, pulse rate measuring means synchronous with said laser output for providing the pulse repetition rate of said laser, a liquid nitrogen cooled detector responsive to the output of said laser to provide an output pulse representative of said laser pulse energy, a pulse waveform averager responsive to said liquid nitrogen cooled detector output and said pulse rate measuring means output to provide respectively pure output signal energy pulses and synchronous time pulse outputs, and recording means responsive to said averager outputs for recording a graph of said output signal energy pulses versus the synchronous pulse repetition rate.

4,018,536

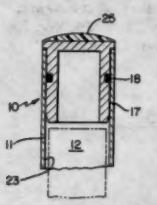
WRITING INSTRUMENT TOP

Arthur Walter Brenner, Cranston, R.I., assignor to Anson Incorporated, Providence, R.I.

Continuation-in-part of Ser. No. 624,662, Oct. 22, 1975. This application Apr. 28, 1976, Ser. No. 681,341
Int. Cl.² G09F 3/00
U.S. Cl. 401—292 3 Claims

1. A writing instrument top comprising a tube having a top

end and a bottom end, and a wall provided with an inside surface forming an axial passageway, a ferrule provided with a circular surface, a circular recess, a circular ledge, and a top,



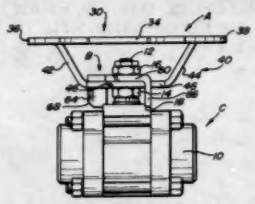
an O ring located in said circular recess, said ferrule positioned in said axial passageway with said O ring engaging said inside surface, and said circular ledge abutting said top end to removably secure said ferrule in said tube.

4,018,537

OPERATING HANDLE

Ulrich H. Koch; Stephen Matousek, both of Moraga, and Richard S. DiGennaro, Berkeley, all of Calif., assignors to Whitey Research Tool Co., Emeryville, Calif.

Filed May 15, 1975, Ser. No. 577,776
Int. Cl.² F16B *2/00*
U.S. Cl. 403—240 **21 Claims**



1. An operating handle assembly adapted to be tightly mounted on an operating member, said operating handle comprising:

a handle member having a first handle mounting opening disposed therein adapted to be received over said operating member; and,

a biasing member including a second mounting opening disposed therein adapted to be received over said operating member in close spaced association with said handle member, said handle and biasing members including cooperating means for forcing opposite sides of said first and second mounting openings toward each other generally axially of said operating member whereby opposed radial clamping forces are applied to opposite sides of said operating member, said biasing member further including handle stops for precisely limiting rotational movement of said operating handle and said operating member.

4,018,538

CROSS ARM HANGER SUPPORT

Emanuel S. Smyrni, and Bobbie L. White, both of Shreveport, La., assignors to Gym-Dandy, Inc., Bossier City, La.

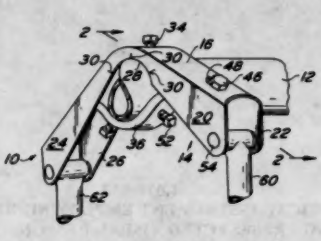
Filed June 17, 1975, Ser. No. 587,798
Int. Cl.² F16D *1/00*; B25G *3/00*
U.S. Cl. 403—346 **6 Claims**

1. A cross arm hanger support adapted to be attached to a horizontally disposed gym set pipe comprising

a. a cross arm having portions converging upwardly from free ends to an apex, said cross arm having generally semi-circular lower edges adjacent and below the apex thereof, each of said portions including a top wall having a hole therein, each of said holes being elongated in a direction towards said apex,

b. a clamp having a flange at each end of a centrally disposed arcuate portion, each flange being generally parallel to one of said top walls, each flange having a hole aligned with one of said holes in said top walls, a bolt for each set of aligned holes,

c. at least one set screw supported by said cross arm adjacent the apex thereof, at least one set screw supported by



said clamp, said set screws being adapted to contact the OD of a pipe to prevent relative rotation of the arm and clamp with respect to the pipe,

d. means at the free ends of said portions for rotatably supporting a hanger, and

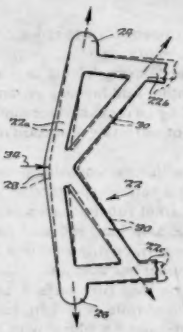
e. said cross arm lower edges having one or more arcuately spaced slits extending radially outwardly from said lower edges to permit the lower edges to accommodate and conform to a pipe having an OD of about 2 inches to 2½ inches.

4,018,539

MODULAR ELASTOMERIC EXPANSION SEAL

Guy S. Puccio, Lancaster, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.

Filed Dec. 5, 1975, Ser. No. 638,200
The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.
Int. Cl.² E01C *11/02*
U.S. Cl. 404—69 **10 Claims**



1. A sealing member for use in an expansion joint having at least one pair of spaced-apart, elongated retaining members defining a gap therebetween, each said retaining member having in cross-section a generally C-shaped cavity with a preselected radius of curvature, each said cavity opening toward said gap defined between said retaining members wherein each said cavity opening is defined between opposed projecting portions of said respective retaining member, said portions being spaced from each other a distance less than the maximum dimension within said cavity taken generally parallel to said opening, said sealing member comprising:

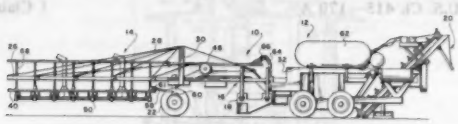
a top and bottom wall spanning said gap and a pair of end walls, each said end wall disposed along and interconnecting corresponding longitudinal edges of said top and bottom walls wherein each of said end walls is received within said cavity of a respective retaining member, and each of said end walls having in cross-section an outer surface portion for matching engagement with said cavity with opposed portions of each said end wall correspondingly abutting said opposed projecting portions of said retaining member whereby relative lateral movement of each said end wall with respect to said retaining member is resisted, and the radius of curvature of the outer surface of each said end wall in an unstressed, disassembled form beingless than said preselected radius of curvature of said cavity so that upon assembly of each said end wall within said respective retaining member cavity said outer surface of each said end wall is affirmatively urged to assume the relatively greater radius of curvature of said cavity by the abutment of said opposed portions of each said end wall with said opposed projecting portions of said respective retaining member.

4,018,540

ROAD MAINTENANCE MACHINE

James A. Jackson, Sr., 8330 Cantrell Road, Little Rock, Ark. 72207

Filed Mar. 5, 1974, Ser. No. 448,404
Int. Cl.² E01C *23/14*
U.S. Cl. 404—95 15 Claims



1. In a road maintenance machine for heating and working a paved surface while moving along a roadway, burner apparatus comprising:

a plurality of burner means suspended from said machine at a predetermined distance above the paved surface for heating and substantially softening the paved surface to a predetermined depth,

said burner means being arranged in rows extending across said paved surface and spaced at a distance from each other to provide for alternately heating and cooling of the pavement surface as the rows of burner means move along said surface thereby allowing substantial heat penetration to said predetermined depth while maintaining the surface temperature below a predetermined limit,

insulating means disposed between adjacent pairs of burner means for substantially confining the heat generated by said burners between said burners and the road surface and for providing a heat shield for protecting the portions of the burner apparatus above the insulating means,

a plurality of hoods each mounted on one of the insulating means over an aperture therein for directing heat and products of combustion upward and outward away from the sides of the roadway, and

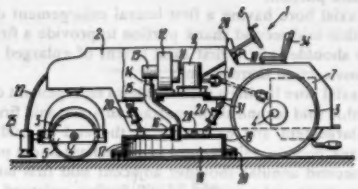
fuel supply means mounted on said machine for providing said burner means with fuel.

4,018,541

ROAD ROLLER FOR COMPACTING PAVEMENTS

Ernst Ivanovich Denikin, Grazhdansky prospekt, 13, korpus 1, kv. 190; Nikolai Yakovlevich Khazkhuta, prospekt Smirnova, 37, korpus 1, kv. 20; Alexandr Andreevich Shestopalov, prospekt Smirnova, 20, korpus 1, kv. 30; Vladimir Vachaganovich Badalov, Grazhdansky prospekt, 124, kv. 441, all of Leningrad; Alexandr Alexandrovich Vasiliev, Volzhsky bulvar, 40, kv. 36, Moscow; Vyacheslav Ivanovich Okunev, ulitsa Schepkina, 12, kv. 47; David Abramovich Kaplan, ulitsa Gertsena, 87, kv. 166, both of Rybinsk Yaroslavskoi oblasti; Jury Borisovich Deinego, ulitsa Druzhby, 2/19, kv. 199, Moscow; Alexandr Danilovich Kazakov, ulitsa 9 aprelya, 68, kv. 5, Kaliningrad; Vladimir Ivanovich Gienko, ulitsa Tovarnaya, 21a, kv. 4, Kaliningrad; Alexei Alexeevich Marchenko, ulitsa Sudostroitelnaya, 72, kv.6, Kaliningrad, and Mikhail Avramovich Laevsky, Moskovsky prospekt, 148, kv.19, Kaliningrad, all of U.S.S.R.

Filed Dec. 4, 1975, Ser. No. 637,704
Int. Cl.² E01C *19/26*
U.S. Cl. 404—130 8 Claims



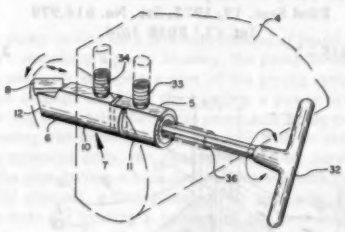
1. A road roller for compacting a road comprising: a chassis; at least one compacting roll mounted on said chassis; ballast means connected to said chassis and provided with a source of vacuum and at least one chamber, said chamber having side walls and being open at one side and having a bottom wall at the other side which is connected to said chassis, said chamber communicating with said source of vacuum and arranged so that in the course of operation said open side of the chamber is covered by the road being compacted, said bottom wall of the chamber being connected to the chassis so that, when the vacuum is induced in the chamber, forces are transmitted from the bottom wall of said chamber to the chassis.

4,018,542

ADJUSTABLE TOOL HOLDER FOR BORING BAR

Harold W. Lindsay, 2480 NW. Vaughn, Portland, Oreg. 97210

Filed June 3, 1976, Ser. No. 692,429
Int. Cl.² B23B *29/02*
U.S. Cl. 408—153 3 Claims



1. In a boring tool, the combination of a boring bar having a constant diameter cylindrical bore extending therein; and a cutting tool disposed within said bore, said tool comprising

a first shank portion;

a cutting tip disposed at one end of said first shank portion;

a second shank portion positioned at the other end of said first shank portion and adapted to mate therewith, said first and second shank portions having cross sections which are equal in exterior dimension, said cross sections conforming to the cross section of said bore in said boring bar, whereby said shank portions are axially slidable with respect to said bore;

a key disposed on the mating end of one of said first and second shank portions;

a keyway disposed on the mating end of the other of said first and second shank portions, said keyway being adapted to receive said key, whereby said shank portions are prevented from axial rotation with respect to each other when said key is received in said keyway, said first and second shank portions cooperating to form a torsionally unitary cutting tool of constant exterior dimension along the entire length thereof;

an axial bore disposed in said first and second shank portions;

said bore extending axially partially into said first shank portion and being screw-threaded therein;

said bore extending axially completely through said second shank portion;

said axial bore having a first lateral enlargement disposed within said second shank portion to provide a first annular shoulder and a first axial extent of enlarged circular cross section therebeyond;

said axial bore having a second lateral enlargement disposed within said second shank portion adjacent said first lateral enlargement and extending to the end of said second shank portion, said second lateral enlargement providing a second annular shoulder adjacent said first lateral enlargement and a socket of still further enlarged circular cross section at the end of said second shank portion; an adjusting screw threadedly received in said axial bore in said first shank portion;

said adjusting screw having an annular laterally enlarged head received and rotatably in said first axial extent of enlarged cross section in said second shank portion, said head abutting said first annular shoulder; and annular retaining means disposed in said socket in said second shank portion;

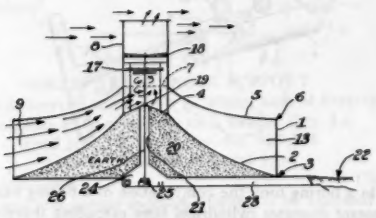
said annular retaining means abutting said second annular shoulder and being adapted axially to retain said head of said adjusting screw in abutting relation with said first annular shoulder, whereby rotation of said adjusting screw advances or retracts said first shank portion axially with respect to said second shank portion to a desired cutting position within said bore in said boring bar.

4,018,543

WHIRLWIND POWER SYSTEM

Earl L. Carson, Felton, and Donald W. Carson, Ben Lomond, both of Calif., assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 19, 1975, Ser. No. 614,979
Int. Cl.² F03B *3/04*
U.S. Cl. 415—2 **2 Claims**



1. A whirlwind power system, comprising

a structural housing having a generally toroidal part substantially horizontally positioned and having an upwardly inclining lower base extending upward from a circumference to a first generally circular central area and an upwardly inclining upper base extending upward from a circumference substantially equidistantly vertically spaced from the circumference of the lower base to a second generally circular central area substantially equidistantly vertically spaced from the first central area, the lower and upper bases being coaxial, and a substantially hollow cylindrical part extending substantially vertically upward from the second central area and substantially coaxial with the lower and upper bases to provide a chimney type flue;

partition means in the toroidal part of the housing for compressing air entering the housing between the circumferences of the lower and upper bases and directing the compressed air in a whirlwind manner to the cylindrical part of the housing and thereby greatly increasing the force of the air, said partition means comprising a plurality of stationary partitions each having the configuration of part of a spiral and extending from the lower base to the upper base, said partitions being equidistantly spaced at the first and second central areas and equidistantly spaced at the circumferences of the lower and upper bases; and

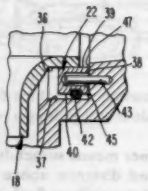
power generating means having rotor means substantially coaxially rotatably mounted in the cylindrical part of the housing and rotated by the air directed via the partition means, said power generating means including a plurality of turbine blades coaxially rotatably supported in the cylindrical part, a chamber formed in the earth under the structural housing, power generating means in the chamber and coupling means coupling the turbine blades to the power generating means for operating said power generating means.

4,018,544

CENTRIFUGAL PUMP

H. Alfred Eberhardt, Paoli, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.

Filed Feb. 20, 1976, Ser. No. 659,742
Int. Cl.² F04D *29/16*
U.S. Cl. 415—170 A **1 Claim**



1. In a fluid pump;

a housing formed with a fluid chamber including a fluid suction section and a fluid discharge section;

an impeller mounted for rotation in said chamber to cause fluid to flow from the suction section to the discharge section, the impeller having an exterior cylindrically shaped working surface concentric with its axis of rotation and being disposed adjacent the suction section;

an interior cylindrically shaped surface formed on said housing adjacent the suction section and substantially concentric with said cylindrical surface on the impeller;

an annular radially extending abutment surface formed on said housing and co-axial with said cylindrical surface on the housing;

a clearance ring disposed between said cylindrical surfaces and separating said suction and discharge sections, the clearance ring having a cylindrically shaped outer surface and a cylindrically shaped inner surface;

means connected between the housing and the ring permitting axial and radial motion of the ring and maintaining the ring in a non-rotary condition while the impeller rotates;

the diameter of the inner surface of the ring being greater than the diameter of the impeller cylindrical surface to form minimal clearance therebetween, the clearance permitting the impeller to rotate and causing the impeller cylindrical surface to immediately contact the inside surface of the ring in the event the impeller is misaligned and/or shifts radially and thereby cause the ring to shift radially while minimizing fluid leakage from the discharge section thru the clearance to the suction section;

the diameter of the outer surface of the ring being substantially less than the diameter of the housing cylindrical surface to provide space for the ring to move radially if caused to do so by the impeller and also for the ring to move axially, the fluid pressure of the discharge section causing the ring to move axially whereby the ring engages said radially extending abutment surface; and

seal means between the ring and the housing to prevent fluid leakage from the discharge section thru said space to the suction section.

4,018,545

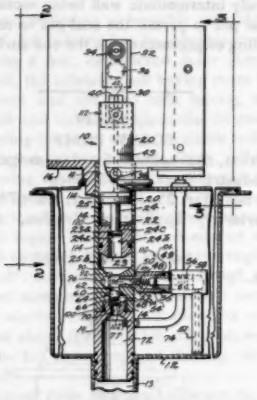
MIX BLENDING PUMP

Omar Knedlik, 2203 Prairie Lane, Coffeyville, Kans. 67337

Continuation-in-part of Ser. No. 534,871, Dec. 20, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,618

Int. Cl.² F04B *3/00, 21/04*

U.S. Cl. 417—262 **10 Claims**



1. A mix blending pump for introducing a predetermined amount of air into a liquid mix comprising:

a. a first piston means slidably disposed within a casing;

b. means for reciprocating said first piston means through an upstroke and downstroke in said casing;

c. a second piston means slidably disposed within said casing and slidably connected to said first piston means to define a first chamber therebetween;

d. means for admitting air into said first chamber;

e. means for admitting liquid mix into a second chamber disposed adjacent to said second piston means;

f. a connecting rod being secured to said first piston means and slidably arranged in a bore in said second piston means;

g. said bore being further provided with abutment means for limiting the distance between said first and second piston means during the upstroke of said first piston means;

said connecting rod being arranged to enable said first piston means to contact said second piston means at a lowermost portion of said downstroke to further displace said second piston means downwardly in said casing to force the air-liquid mixture from said second chamber;

said connecting rod being provided with adjustable means for selectively changing the distance between said first and second piston means at the top of the upstroke to thereby control the amount of air introduced into said first chamber and correspondingly control the amount of air introduced into the liquid mix;

said adjustable means comprising an additional rod secured to said connecting rod and threadedly secured to said first piston means;

said first piston means drawing a predetermined amount of air through said air admitting means into said first chamber and said second piston means drawing a predetermined amount of liquid mix through said liquid admitting means into said chamber during the upstroke, said first piston means displacing air from said first chamber through at least one port in said second piston means into said second chamber during the downstroke to thereby introduce a predetermined amount of air into the liquid mix.

4,018,546

PUMP DEVICE FOR FLOW RATE CONTROL OF LIQUID IN A PIPING SYSTEM

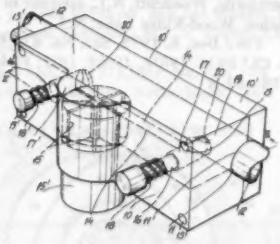
Sven Runo Vilhelm Gebelius, Fridhemsgatan 27, Stockholm, Sweden (S-11240)

Filed Nov. 21, 1974, Ser. No. 525,980

Claims priority, application Sweden, Dec. 28, 1973, 7317505

Int. Cl.² F04B *21/00*

U.S. Cl. 417—313 **6 Claims**



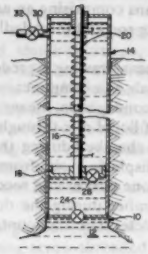
1. A pump device for a flow rate control of liquid in a piping system comprising a pump housing, the pump housing having means sealingly engaging a pipe of the piping system so that the pipe extends axially of the housing, a power driven pump unit having a rotatable part, said pump unit being mounted on the housing, the housing being provided with an axial channel having opposite ends, the channel extending parallel to the pipe, the pipe having a hole communicating with each end of the axial channel, a first guide on the pipe adjacent the upstream hole for guiding a portion of the flow into the axial channel, a second guide on the pipe adjacent the downstream hole for guiding the liquid in the axial channel back into the pipe, and the rotatable part of the pump unit being located in the axial channel so that upon activation of the pump unit, the liquid in the axial channel is pumped via the downstream hole into the pipe thereby accelerating the liquid flow through the pipe.

4,018,547

PUMPING BY WIRE ELONGATION

Neil E. Rogen, 3 Beaver Dam Road, Upper Saddle River, N.J. 07458

Filed Aug. 28, 1975, Ser. No. 608,504
Int. Cl.² F04B 17/00
U.S. Cl. 417—321 7 Claims



1. Sucker rod type comprising,

means defining a pumping piston member for cyclically engaging a liquid pool and transferring liquid from one face of the piston to an opposite face to produce a liquid column on top of the piston member,

means defining an elongated martensitic transformation member of at least one hundred feet length carrying and suspending said piston member,

means defining a down-stroke driver for elongating said martensitic transformation material by about 5% and inducing said transformation at a first relatively cold temperature,

and means for heating said martensitic material to reverse the transformation and automatically reverse said elongation lifting the liquid column,

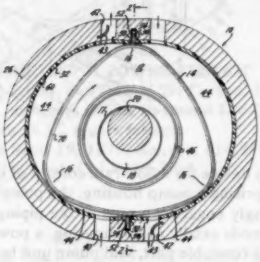
to provide lowering and raising portions of a pumping cycle.

4,018,548

ROTARY TROCHOIDAL COMPRESSOR

Murray Berkowitz, Woodcliff, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge Lake, N.J.

Filed Dec. 8, 1975, Ser. No. 638,513
Int. Cl.² F01C 19/04, 19/08, 1/02; F04C 27/00
U.S. Cl. 418—61 A 1 Claim



1. A rotary mechanism such as a compressor, expansion engine or the like comprising:

a. an outer body comprising a pair of axially-spaced end walls and an intermediate wall defining a cavity therebetween;

b. an inner body mounted for relative rotation within said cavity and having its axis eccentric to the axis of said outer body, the peripheral surface of said inner body being substantially a hypotrochoid with three nose portions and the inner peripheral surface of said outer body intermediate wall being substantially the outer envelope of the hypotrochoidal peripheral surface of the inner body such that said intermediate wall peripheral surface has two diametrically opposed regions which generate said hypotrochoidal surface and such that a plurality of working chambers are formed between said inner body and said intermediate wall;

c. said nose portions of the inner body having sealing cooperation with the inner surface of the housing intermediate wall;

d. a radially movable seal bar carried by the outer body intermediate wall at each of said hypotrochoid generating regions and spring means for urging each seal bar into sealing contact with the hypotrochoid peripheral surface of the inner body;

e. said outer body having intake and discharge ports so disposed on opposite sides of each said seal bar such that each working chamber moves out of communication with an intake port before it subsequently moves into communication with a discharge port;

f. axially movable seal strip means carried by and end face of the inner body for sealing engagement with the adjacent outer body end wall, said seal strip means being disposed adjacent and parallel to but radially inwardly of the hypotrochoidal peripheral surface of the inner body; and

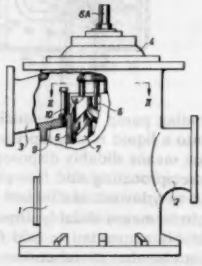
g. an axially movable seal pin carried by said last-mentioned end wall of the outer body adjacent to each seal bar with each said seal pin having a recess for receiving an extension of the adjacent end of its associated seal bar, and spring means for urging said axially movable seal pin into sealing engagement with the adjacent portion of the end surface of the inner body extending from said disposed radially outwardly of said seal strip means and with the outer body intermediate wall being recessed adjacent to each seal pin to permit the seal pin to move axially into said sealing engagement with the end surface of the inner body.

4,018,549

SCREW PUMP

Lars Segerström, Skarholmen, Sweden, assignor to Aktiebolaget Imo-Industri, Stockholm, Sweden

Filed Mar. 29, 1976, Ser. No. 671,486
Claims priority, application Sweden, Apr. 2, 1975, 75037879
Int. Cl.² F04C 17/12
U.S. Cl. 418—197 2 Claims



1. A screw pump comprising a screw unit having a drive screw and two impeller screws arranged symmetrically around the drive screw, said screws being enclosed in a housing having mutually intersecting passages for accommodating the screws, said unit being so constructed that the screws seal against each other and against the housing to form chambers in which, during rotation of the screws, liquid is carried from the suction side to the pressure side, characterized in that arranged on the pressure side in the passage accommodating one of the impeller screws is a recess which passes from the pressure side and the length of which is such that each cham-

ber is opened at considerable differences in time in the passages of the two impeller screws.

4,018,550

STRIPPING AND DEPOSITING MECHANISM FOR CALENDERED SHEETS

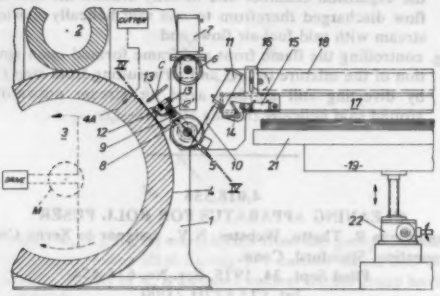
Helmuth Theysohn, Weihbergstrasse 25C, 3 Hannover, Germany

Filed Sept. 26, 1974, Ser. No. 509,431

Claims priority, application Germany, Dec. 10, 1973, 2351265

Int. Cl.² B29C *15/00*

U.S. Cl. 425—363 **5 Claims**



1. Calender device for producing rubber-asbestos sheets, comprising:

a calender unit including a heatable calender roll and a counter roll, for calendering an asbestos-carrying rubber solution into a hot, calendered layer surrounding the calender roll, the calender roll having more than 1 meter circumference and the two rolls having more than 1 meter length and having axes parallel to one another;

means for cutting the layer on the heatable roll to provide a hot, calendered rubber-asbestos sheet, adhering to said roll and having more than one meter side length on all sides of the sheet;

suction means located alongside the heatable roll for engaging an edge region of the hot, calendered sheet on said roll and for stripping the engaged edge region from said heatable roll, comprising a plurality of suction cups spaced apart along a line parallel to said axes, means for moving the suction cups into locations on and longitudinally spaced along the heatable roll and, with the edge region of the hot sheet engaged thereby, away from the heatable roll;

a pair of draw-off rolls disposed adjacent to and smaller than the heatable roll, parallel to said axes for rotation to facilitate a movement of further portions of the hot sheet, away from the heatable roll regardless of adhesion of the rubber-asbestos of the sheet to said roll; and

means for effecting the movement of the further sheet portions, while the sheet is still hot, comprising draw-off grippers engageable with the stripped edge region of the hot sheet, and a gripper device for longitudinally moving the grippers, engaged with the edge region of the hot sheet, away from the heatable roll.

4,018,551

TABLE FOR PLASTIC FORMING APPARATUS

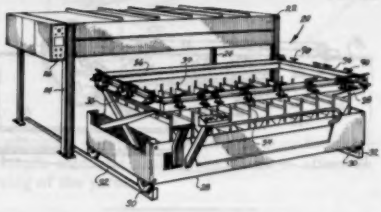
Jack N. Shuman, 3330 Foxcroft Road, Charlotte, N.C. 28211

Filed July 28, 1975, Ser. No. 599,784

Int. Cl.² B29C *17/04*

U.S. Cl. 425—388 **13 Claims**

1. Apparatus for use in forming plastic material into predetermined configurations, said apparatus comprising a forming table including a central area having a plurality of upstanding support members arranged in a predetermined pattern spaced from one another, a selectively removable platform member formed with means for engaging the upstanding ends of predetermined ones of said support members whereby said platform member will be supported on said support members, said platform member being adapted to have mounted thereon a vacuum forming mold and including means for connecting the interior of said vacuum forming mold to a vacuum source, and



a clamping frame having selectively adjustable side elements for varying the size of said clamping frame and having clamping means for engaging the side edges of a sheet of said plastic material, said clamping frame being selectively positionable in said central area of said forming table with said adjustable side elements located between predetermined ones of said tubular support members to hold said side edges of said plastic sheet along and beneath the lowermost edges of said vacuum forming mold supported by said platform member.

4,018,552

PRESSING BLOCK FOR DIE PRESSING THERMOPLASTIC MATERIAL

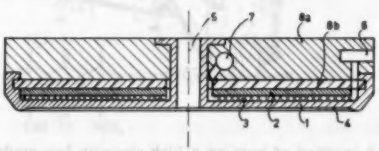
Gijsbert Prast; Andries Mijnheer, and Jan Mulder, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,146

Claims priority, application Netherlands, Nov. 27, 1974, 7415442

Int. Cl.² B29D *17/00*; B29C *3/00*

U.S. Cl. 425—407 **7 Claims**



1. A pressing block for die pressing thermoplastic material, comprising

a supporting element;

a double-walled assembly, having a first wall connected to the supporting element for receiving a pressure load during pressing, and a second wall arranged to support a die for pressing, wherein said assembly comprises a thin layer of porous heat conducting material, and said first and second walls are formed by first and second thin metal sheets bonded to respective sides of the thin layer; and

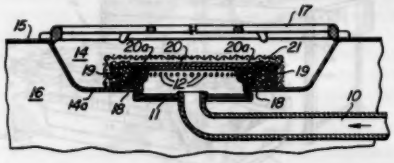
means for conducting pressurized heating and cooling media to said thin layer for flow through said layer.

4,018,553

CATALYTIC FLAME-TYPE GAS BURNER ASSEMBLY AND METHOD OF BURNING GAS

Nathaniel R. Baker, Los Angeles, Calif., and Frank E. Lynch, Littleton, Colo., assignors to Mountain Fuel Supply Company, Salt Lake City, Utah

Filed May 27, 1975, Ser. No. 581,033
Int. Cl.² F23D 13/14
U.S. Cl. 431—7 12 Claims



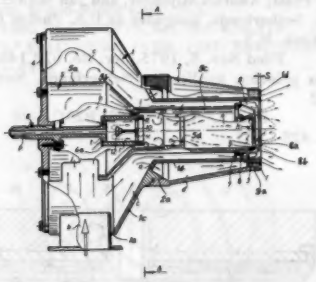
1. A catalytic, flame-type, gas burner assembly, comprising a flame-type gas burner having a burner head adapted to be connected to a source of fuel gas and one or more gas burner jet orifices in said head; a mass of surface-exposed steel wool contiguous to said head as a catalyst and covering each of said gas jet orifices with a sufficient quantity of the surface-exposed steel wool to significantly reduce formation of nitrogen oxides during combustion of the fuel gas; and draft airflow passages leading into and out of the mass of steel wool to provide flow of combustion air through said mass during burning of the fuel gas therein.

4,018,554

METHOD OF AND APPARATUS FOR THE COMBUSTION OF LIQUID FUELS

Constantin Teodorescu, and Corneliu Vlădut Costache, both of Bucharest, Romania, assignors to Institutul Pentru Creatie Stintifica si Tehnica-Increst, Bucharest, Romania

Filed Jan. 14, 1976, Ser. No. 648,872
Claims priority, application Romania, Mar. 19, 1975, 81712
Int. Cl.² B05B 7/04, 7/10; F23D 7/00
U.S. Cl. 431—9 10 Claims



1. A method of burning a high-viscosity low-grade liquid fuel comprising the steps of:

a. directing a stream of the liquid fuel against a first impingement baffle in an impact chamber to produce rebounding fuel particles;

b. mixing air with said particles within said chamber to form a fuel-air mixture;

c. passing said fuel-air mixture around said impingement baffle and along an internal wall of said chamber while preventing deposition of fuel thereon by conducting an annular stream of air along said wall to discharge the fuel-air mixture axially from said chamber;

d. passing said fuel-air mixture and a further annular stream of air axially away from said chamber while intercepting same in succession with a pair of axially spaced inwardly directed annular steps thereby turbulently mixing said further air and said fuel-air mixture to produce a high velocity fuel-air flow;

e. introducing said fuel-air flow axially into an expansion chamber and directing the same against a second impingement baffle to further pulverize the fuel in said fuel-air flow, and discharge the same axially from said expansion chamber;

f. directing a helically flowing stream of air axially beyond the expansion chamber and directly around the fuel-air flow discharged therefrom to mix said helically flowing stream with said fuel-air flow; and

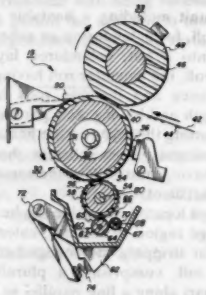
g. controlling the flame front and frame formed upon ignition of the mixture of fuel and air resulting from step (f) by diverting still another axial air stream outwardly around said helically flowing stream.

4,018,555

CLEANING APPARATUS FOR ROLL FUSER

Raghulinga R. Thettu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 24, 1975, Ser. No. 616,454
Int. Cl.² F27D 23/00
U.S. Cl. 432—75 6 Claims



1. Fuser apparatus for fixing toner images to substrate material, said apparatus comprising:

a pair of nip-forming members between which said substrate material moves with said toner images contacting a heated one of said nip-forming members;

means for elevating the surface temperature of said heated member to thereby render said toner images tacky;

cleaning means for removing contaminants from the surface of said heated member;

a combination mixing and tacky material supply member supported for contact with said cleaning means to thereby effect thorough mixing of contaminants with tacky material, said tacky material comprising a polymeric material which is tacky at the operating temperature of said fuser apparatus; and

a smoothing member operatively engaging said combination mixing and supply member for maintaining a substantially uniform surface on said mixing and supply member; said smoothing member comprising an adhesive surface.

4,018,556
HAIR DYE COMPOUNDS

Gregoire Kalopissis, Paris, and Andree Bugaut, Boulogne-sur-Seine, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

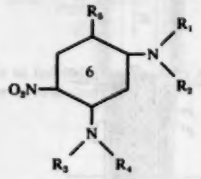
Continuation-in-part of Ser. No. 550,583, Feb. 18, 1975, which is a division of Ser. No. 70,480, Sept. 8, 1970, Pat. No. 3,904,690, which is a continuation-in-part of Ser. No. 598,179, Dec. 1, 1966, Pat. No. 3,560,136. This application Aug. 11, 1975, Ser. No. 603,583

Claims priority, application Luxembourg, Dec. 3, 1965, 49990; Apr. 13, 1966, 50894; Oct. 19, 1966, 52201

Int. Cl.² C07D *295/06*

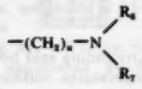
U.S. Cl. 8—10.1 9 Claims

1. A water soluble compound having the formula



(I)

in which R_1, R_2, R_3, R_4 are selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms and only one of R_1, R_2, R_3 or R_4 is an extra nuclear amino group having the formula:



in which R_6 and R_7 together with the N atom form morpholino and piperdino groups, *n* represents a number between 2 and 6, and R_5 is selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms halogen and lower alkoxy having 1–4 carbon atoms and quaternary ammonium salts of said compound obtained by quaternization of the tertiary extra nuclear amino group.

7. Hair dye compositions which contain a hair coloring amount of the composition of claim 1.

9. The process of dyeing live human hair with the composition of claim 7.

4,018,557
METHOD FOR TRANSFER COLOR PRINTING

Richard Donovan Glover, Ings Mills, Dale St., Ossett, Yorkshire, England

Division of Ser. No. 422,093, Dec. 5, 1973, abandoned. This application July 2, 1975, Ser. No. 592,552

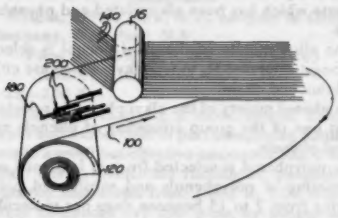
Claims priority, application United Kingdom, Dec. 6, 1972, 56189/72; Dec. 12, 1972, 57304/72; Dec. 12, 1972, 57306/72

Int. Cl.² D06P *7/00*; B41M *5/26*

U.S. Cl. 8—1 XB 3 Claims

1. A method of making a patterned pile fabric from yarns having an affinity for sublimatic dyestuffs, comprising the steps of

1. depositing the sublimatic dyestuffs in parallel strips on a transfer sheet whereby each deposited strip is located in relation to the other strips on the transfer sheet in accordance with the pattern to be produced in the pile fabric and has a length equal to or a whole number of times a modular length corresponding to the height of the pile of the fabric,
2. disposing the yarns in parallel relation at a dyeing station to cause the yarns to register with the parallel strips on the transfer sheet,
3. heating the transfer sheet to cause the dyestuffs to sublimate at the dyeing station, and



4. producing a differential pressure to draw the sublimated dyestuffs into and around the yarns to effect an even dyeing of the yarns.

4,018,558
EXHAUST PROCESS FOR THE DYEING OF SYNTHETIC ORGANIC TEXTILE MATERIAL IN NAVY BLUE TO BLACK SHADES

Hans Wilhelm Liechti, Oberwil, and Raymond Défago, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

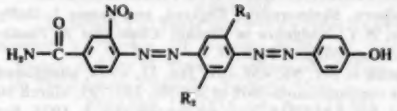
Division of Ser. No. 467,044, May 6, 1974, Pat. No. 3,972,676. This application Apr. 9, 1976, Ser. No. 675,386

Claims priority, application Switzerland, May 9, 1973, 6539/73; Mar. 23, 1974, 4360/74

Int. Cl.² C09B *27/00*, *45/48*

U.S. Cl. 8—26 12 Claims

1. A process for dyeing synthetic organic textile material in navy blue to black shades, by the exhaust process, from halogenated hydrocarbons, which process comprises the use of at least one diazo dyestuff of formula Ib



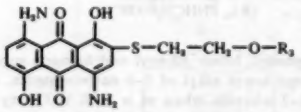
(Ib)

wherein

R_1 is hydrogen, or an alkyl or alkoxy radical having 1 to 4 carbon atoms, and

R_2 is hydrogen, or an alkyl or alkoxy radical having 1 to 4 carbon atoms or trifluoromethyl,

in admixture with the anthraquinone dyestuff mixture of formula III



(III)

wherein R_3 represents a mixture of H and $-CH_2-CH_2-S-CH_2-CH_2-OH$.

4,018,559
NON-REWET LEATHER AND METHOD OF PRODUCING SAME

Clinton E. Retzsch, Morris Township, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 479,131, June 14, 1974, abandoned. This application May 5, 1975, Ser. No. 574,634

Int. Cl.² C14C *5/00*, *3/18*

U.S. Cl. 8—94.2 8 Claims

1. In a method of treating chrome tanned leather stock

which includes the step of treating said leather stock with a polymeric phosphate ester wherein said polymeric phosphate ester is a composition comprising an alkyl phenol polyphenol condensate which has been alkoxylated and phosphated, and in which

A. The alkyl moiety of the alkyl phenol is selected from amongst saturated C_4 to C_{18} alkyls which are either linear or branched chain,

B. the phenol moiety of the alkyl phenol is selected from at least one of the group consisting of phenols and substituted phenols,

C. the polyphenol is selected from at least one of a group consisting of polyphenols and substituted polyphenols, having from 2 to 15 benzene rings per molecule,

D. the alkyl phenol and polyphenol are joined by an aldehyde, substituted aldehyde, or aldehyde liberating composition selected from at least one of the group consisting of aldehydes, substituted aldehydes, and aldehyde liberating compounds,

E. the alkoxylating agent is selected from at least one of the group consisting of ethylene oxide, propylene oxide, butylene oxide and isobutylene oxide, and

F. the phosphating agent is selected from at least one of a group consisting of polyphosphoric acid, phosphoric acid, phosphorous pentoxide, pyrophosphoric acid, phosphorous acid, phospholeum and phosphorous oxychloride, further characterized in that the total number of benzene rings contained in one molecule of the condensate is between 3 and 16 wherein said solvent treatment procedure comprises immersing said leather stock in a solvent selected from the group consisting of chloroform, perchlorethylene, n-Hexane, Ethyl alcohol, Ethylether, Acetone, Methyl ethyl ketone, Stoddard Solvent, Petroleum ether.

4,018,560

DIALKYL ALKYL AND CYCLIC PHOSPHORAMIDOMETHYL PHOSPHONATES

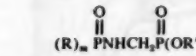
Peter Golborn, Skelmersdale, England, and James J. Duffy, Buffalo, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 438,481, Jan. 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 239,799, March 30, 1972, Pat. No. 3,812,218. This application Oct. 1, 1975, Ser. No. 618,720

Int. Cl.² D06M *13/34*

U.S. Cl. 8—190 **19 Claims**

1. A process for rendering textiles flame retardant which comprises applying to said textile a flame retardant amount of a compound of the formula



wherein R' is phenyl, lower alkenyl and halogen substituted and unsubstituted lower alkyl of 1–6 carbon atoms, *m* is an integer from 1–2 wherein when *m* is 2, R is alkoxy of 1–8 carbon atoms and when *m* is 1, R is alkylene dioxy of 2–8 carbon atoms.

4,018,561

APPARATUS FOR EXTRACTION OF POLONIUM - 210 FROM IRRADIATED BISMUTH USING MOLTEN CAUSTIC

Dan H. Siemens, Jr., and Earl J. Wheelwright, both of Richland, Wash., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Feb. 26, 1975, Ser. No. 553,241

Int. Cl.² B01D *11/04*; C01G *57/00*

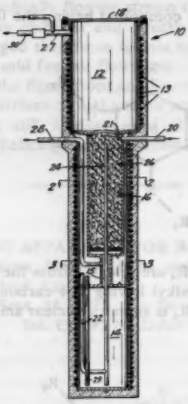
U.S. Cl. 23—267 R **3 Claims**

1. An extraction apparatus for removing polonium-210 from irradiated bismuth by extraction into molten caustic consisting of a self-supporting unitary hollow body containing vertically superimposed compartments comprising:

an upper melting chamber suitable for melting solid irradiated bismuth;

an intermediate extraction chamber suitable for containing molten caustic communicating with said melting chamber at its upper end, the lower end of said extraction chamber having an outlet of restricted cross-section facilitate separation of molten bismuth from molten caustic;

a lower reservoir chamber connected at its upper end to the outlet of said intermediate extraction chamber for containing molten bismuth;



heating elements surrounding said body to heat said compartments to temperatures sufficient to maintain said caustic and bismuth in molten condition;

pump means and associated distribution means contained within said hollow body for moving said molten bismuth from said reservoir chamber to a discharge point at the upper end of said extraction chamber and to permit molten bismuth to pass downwardly through molten caustic in said extraction chamber in drop-wise form;

means for excluding oxygen from and producing an inert atmosphere within said apparatus; and

means for removing the polonium-carrying molten caustic from said extraction chamber.

4,018,562

CHEMILUMINESCENT NITROGEN DETECTION APPARATUS AND METHOD

Robert E. Parks, Houston, and Robert L. Marietta, Richmond, both of Tex., assignors to Antek Instruments, Inc., Houston, Tex.

Filed Oct. 24, 1975, Ser. No. 625,510

Int. Cl.² G01N *21/24*, *31/12*, *31/08*

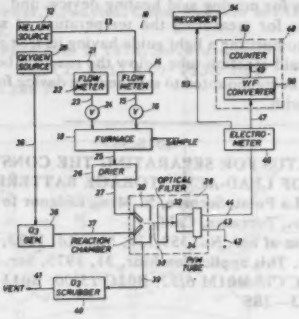
U.S. Cl. 23—230 PC **10 Claims**

1. The method for determining the total chemically combined nitrogen content of a sample comprising the steps:

a. decomposing said sample in one step in the presence of an oxygen-rich atmosphere of oxygen and an inert gas and at a temperature sufficiently above 700° C. that substantially all of the chemically bound nitrogen is recovered as nitric oxide (NO), such decomposition being conducted in the absence of a catalyst,

b. causing the nitric oxide produced by such decomposition to undergo a chemiluminescent reaction with ozone, and

c. determining the magnitude of the chemiluminescent



reaction to indicate the quantity of chemically combined nitrogen in said sample.

4,018,563

ANALYSIS OF LOW ION CONTENTS

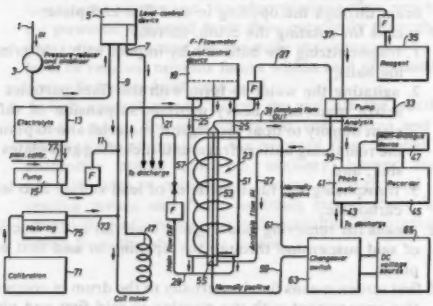
Nils Rune Lundqwist, and Gustav Lennart Dahl, both of Nykoping, Sweden, assignors to Aktiebolaget Atomenergi, Stockholm, Sweden

Filed Aug. 15, 1975, Ser. No. 605,003

Claims priority, application Sweden, Aug. 21, 1974, 74106535

Int. Cl.² G01N 31/22, 33/18; C25B 1/24

U.S. Cl. 23—230 R 21 Claims



1. A method of analyzing a solution having low contents of halogenide ions selected from the group consisting of chloride, bromide, and iodide ions to determine the halogenide ion content thereof which comprises (a) extracting a constant test solution flow from the solution to be analyzed; (b) dividing said test solution flow into an analysis flow and a main flow; (c) passing said analysis flow and said main flow over respective sides of an electrodialysis diaphragm; (d) electrolyzing said analysis flow and said main flow to obtain an analysis flow with a halogenide ion concentration higher than that prior to electrodialysis and to convert said halogenide ions in said electrodialyzed analysis flow into elementary halogen, and to obtain a main flow with a halogenide ion concentration lower than that prior to electrodialysis; and then (e) photometrically analyzing the electrodialyzed analysis flow thus obtained to determine its elementary halogen content.

4,018,564

SILICONE COMPOSITION FOR ANALYZING BLOOD SAMPLES

John H. Wright, Clifton Park, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,563

Int. Cl.² C07F 7/18; G01N 33/16

U.S. Cl. 23—230 B 14 Claims

8. A method for analyzing a blood sample composed of blood serum and blood clots in part comprising adding to said blood sample a small but effective amount of blood-separating composition having controlled rheological properties and a specific gravity that varies from 1.035 to 1.06 wherein said composition comprises (a) 100 parts by weight of a diorganopolysiloxane and blends of such diorganopolysiloxanes which are compatible with each other of a viscosity varying from 10,000 to 500,000 centipoise at 25° C where the organo groups are selected from the group consisting of methyl, phenyl, chlorophenyl and mixtures thereof; (b) from 3 to 50 parts by weight of a filler selected from the group consisting of a fumed silica and fumed silica treated with a silicone compound wherein the amount of treated fumed silica varies from 0 to 100% by weight of the total silica present; and (c) from 0.05 to 3 parts by weight of a stablizing compound of the formula,

$$R'O\,(C_aH_{2a}O)_x(C_bH_{2b}O)_yH$$

where R′ is a member selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 7 carbon atoms, *a* and *b* are integers equal to from 1 to 4 inclusive, *x* is an integer equal to from about 4 to 5 or more and *y* is a whole number equal to from 0 to 50; and centrifuging the blood sample and said blood-separating composition to separate said blood serum from said blood clots with said blood-separating composition forming an integral barrier between said blood clots and said blood serum.

4,018,565

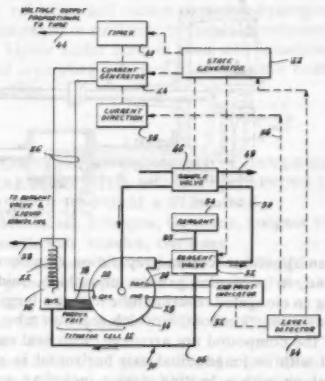
AUTOMATIC PROCESS TITRATION SYSTEM

Kenneth S. Fletcher, III, Norfolk; William E. Earle, North Easton, and Jay M. Weiner, Foxboro, all of Mass., assignors to The Foxboro Company, Foxboro, Mass.

Filed Oct. 17, 1975, Ser. No. 623,381

Int. Cl.² G01N 31/16, 27/44

U.S. Cl. 23—253 R 27 Claims



1. An automatic process titration system for measuring the concentration of a process stream comprising:

a titration cell having two compartments separated by a porous membrane,

one of the titration cell compartments being a working compartment including an electrode means for generating titrant electrolytically,

means for detecting a titration endpoint operatively associated with the working compartment,

the other of the compartments being an auxiliary compartment including an electrode coupled to the generating electrode means for enabling the electrogeneration of titrant,

positionable sample valve means for obtaining a sample of the process stream,

the sample valve means having at least two operative positions and being located in relation to the process stream so as to permit process stream flow therethrough in one position and injection of a predetermined amount of sample from the process stream into the titration cell in its other position,

positionable reagent valve means for introducing reagent for generating titrant to the titration cell,

the reagent valve means having at least two operative positions and being located in relation to the titration cell so as to permit working compartment contents flow therethrough in one position and introduction of reagent to the titration cell in its other position,

the sample valve means, reagent valve means and titration cell being interconnected to form a cell loop means for the flow of titration constituents therethrough,

current source means for providing current to the titrant generating electrodes,

fluid circulating means for circulating titration constituents,

valve operating means for positioning the sample and reagent valve means, and

state generator means operatively connected to the current source means, and to the valve operating means for actuating them in a preset sequence for achieving a titration cycle.

4,018,566

LIGHT RESPONSIVE MEASURING DEVICE FOR HEATER CONTROL

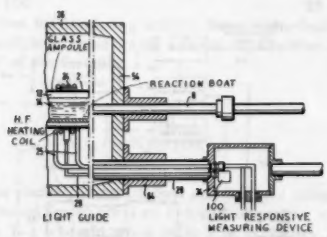
Klaus Zeuch, Eckental, and Josef Stadter, Erlangen, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 17, 1975, Ser. No. 559,016

Claims priority, application Germany, Mar. 27, 1974, 2414856

Int. Cl.² B01J *17/08, 17/06*

U.S. Cl. 23—273 SP **6 Claims**



1. In an apparatus for the preparation of a semiconductor compound, in particular gallium phosphide, said apparatus including an elongated reaction tube having a longitudinal axis containing a reaction boat, in which reaction tube the components of the compound are arranged, with said reaction tube disposed with its longitudinal axis horizontal in a horizontal system along with a heating device including an oven surrounding said tube and an inductive high frequency heater, the reaction tube and heating device arranged within an enclosed pressurized vessel, with the heating device and reaction vessel movable relative to each other, the improvement comprising:

a. means for maintaining the reaction tube stationary;

b. means supporting the heating device for horizontal movement with respect to the stationary tube in the direction of the longitudinal axis of said tube;

c. means for moving said heating device; and

d. means for measuring the temperature at said reaction boat comprising a light guide having its free end arranged near said reaction tube below the reaction boat said light guide being mounted to said heating device for movement therewith.

4,018,567

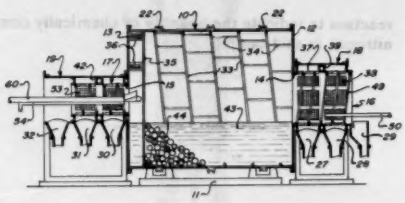
APPARATUS FOR SEPARATING THE CONSTITUENTS OF LEAD-ACID STORAGE BATTERIES

Albert E. La Point, Socorro, N. Mex., assignor to James P. La Point, Jr., Torrance, Calif.

Division of Ser. No. 359,732, May 14, 1973, Pat. No. 3,892,563. This application Mar. 31, 1975, Ser. No. 563,648

Int. Cl.² H01M *6/52;* **B02C** *15/00;* **B01J** *2/12*

U.S. Cl. 23—285 **9 Claims**



1. Apparatus for separating the constituents of lead-acid storage batteries of the type having at least grid plates of antimonial lead, active material consisting of lead, lead oxide, and lead sulfate, and battery case and separators of organic material comprising:

a. a rotatable cylindrical drum having first and second end plates each provided with a circular opening therein;

b. a quantity of grinding balls within said drum;

c. means for feeding the batteries, together with a predetermined quantity of sodium carbonate and water into the drum through the opening in said first end plate;

d. means for rotating the drum, thereby:

1. fragmentizing the batteries by impact with said grinding balls;

2. agitating the water to form with the finer particles of active material a heavy medium suspension of sufficient density to float the organic material and to permit the remaining battery fragments including grid plates to sink; and

3. transposing the finer particles of lead sulfate into lead carbonate;

e. means for removing said organic material and a fraction of said suspension through the opening in said first end plate;

f. first screen means fixed externally to the drum in cooperative engagement with the opening in said first end plate for receiving said organic material and suspension fraction, said first screen means being adapted to retain said organic material and pass the suspension fraction therethrough;

g. means for segregating said sinkable fragments toward the second end plate;

h. means for segregating said sinkable fragments into smaller and larger fragments comprising a baffle fixed adjacent said second end of said drum;

i. means for discharging said smaller sinkable fragments through the opening in said second end plate; and

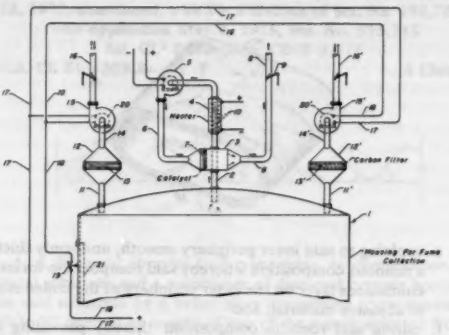
j. second screen means fixed externally to the drum in cooperative engagement with the opening in said second end plate for receiving said smaller sinkable fragments, said second screen means being adapted to retain said smaller sinkable fragments and pass any fine particles of active material therethrough.

4,018,568

FUME ABSORBING-TREATING SYSTEM

Gerald L. Brewer, Rowayton, Conn., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 9, 1976, Ser. No. 656,673
Int. Cl.² B01J 8/02; F23G 7/06
U.S. Cl. 23—288 F 4 Claims



1. A fume elimination and venting system for enclosures generating burnable and absorbable noxious fumes which will provide for additional venting for controlled periods of time, which comprises in combination:

a. at least one blower operated first venting means from the fume generating enclosure connecting with a fume incinerating means to provide for the withdrawal and passage of vented fumes into contact with fume oxidizing means and the subsequent discharge of treated fumes and gases from the system,

b. additional vent means from said enclosure in interconnection with at least one fume absorption section containing a gas pervious absorptive media and opening to external ambient air,

c. auxiliary blower means in interconnection with said additional vent means and the absorption section providing for powered operated fume flow outwardly through the absorptive media and the resulting maintenance of a low level of residual noxious fumes within said enclosure for controlled periods of time, and

d. switch control means to cut on and off the auxiliary blower means for said additional vent means and for effecting the stoppage of the outward flow through the absorptive media and the auxiliary blower means whereby with a continuing venting through said first venting means and fume oxidizing means there is an inward flow of ambient air and a resulting desorption of fumes from the absorptive media.

4,018,569

METAL OF IMPROVED ENVIRONMENTAL RESISTANCE

David R. Chang, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 549,769, Feb. 13, 1975, Pat. No. 3,976,436. This application Feb. 18, 1976, Ser. No. 659,045
Int. Cl.² B32B 15/00, 15/18; C22C 19/00, 38/06
U.S. Cl. 428—678 5 Claims

1. An alloy of improved environmental resistance consisting essentially of, by weight, 8–30% Al, 0.1–10% Hf, 0.5–20% of an element selected from the group consisting of Pt, Rh and Pd, up to 3% Y and the balance an element selected from the group consisting of Fe, Co and Ni.

4,018,570

COMPOSITE OF A METALLIC MATERIAL AND VULCANIZED RUBBER

Yuzuru Nakamoto, Kodaira; Eishi Kubota, Kokubunji, and Fukushi Suzuki, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Division of Ser. No. 447,631, March 4, 1974, Pat. No. 3,961,740. This application Jan. 30, 1976, Ser. No. 653,775
Claims priority, application Japan, Mar. 12, 1973, 48-27925
Int. Cl.² B32B 15/06
U.S. Cl. 152—359 4 Claims

1. A composite product which is a metallic base and a vulcanized rubber with an intermediate adhesive layer which is a tertiary alloy containing from 59 to 73% by weight copper, 23 to 34% by weight zinc, and 2 to 13% by weight tin.

4,018,571

TREATMENT OF SOLID FUELS

Edward L. Cole, Fishkill, and Howard V. Hess, Glenham, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 20, 1975, Ser. No. 551,486
Int. Cl.² C10L 9/00, 5/14
U.S. Cl. 44—1 R 11 Claims

1. A process for upgrading a low rank solid fuel which comprises forming a slurry of said fuel with water, heating the slurry under super atmospheric pressure to a temperature between about 300° F. and the critical temperature of water, cooling the heated slurry, mixing with the slurry a hydrocarbon liquid in an amount between about 4 and 5 parts by weight fuel per part liquid thereby forming solid fuel-hydrocarbon agglomerates and separating said agglomerates from said water.

4,018,572

DESULFURIZATION OF FOSSIL FUELS

Rollan Swanson, 220 California Ave., Santa Monica, Calif. 90403

Filed June 23, 1975, Ser. No. 589,412
Int. Cl.² C10L 9/10; C10G 19/00
U.S. Cl. 44—1 R 11 Claims

1. A process for desulfurizing a fuel of the group of coal, tar sands, (flue gases produced by the combustion thereof) and natural gases, which comprises reacting said fuel prior to combustion thereof with at least one non-volatile, unsaturated sulfur compound of an alkali metal of the group of sodium, potassium, rubidium and cesium or with a hydrogen polysulfide at a temperature sufficient to form a corresponding polysulfide to higher sulfur content than said unsaturated compound, and separating a fuel of reduced sulfur content from said polysulfide.

4,018,573

REACTOR FOR THE CATALYTIC CONVERSION OF HYDROCARBONS WITH A GAS CONTAINING OXYGEN TO FORM A FUEL GAS

Hellmuth Mentschel, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 23, 1975, Ser. No. 589,001
Claims priority, application Germany, June 28, 1974, 2431207; May 15, 1975, 2521730
Int. Cl.² B01J 8/02; C01B 2/16; F02B 43/08
U.S. Cl. 48—107 5 Claims

1. In a reactor for the generation of a gas by the catalytic conversion of hydrocarbons with a gas containing oxygen at elevated temperatures, said reactor having a reaction chamber filled with a catalyst charge with an inlet for raw materials and an outlet for the product gas, the improvement comprising:

a. a closed housing for said reactor;

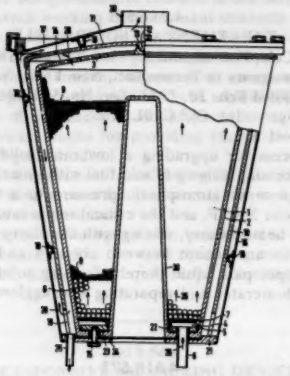
b. an enclosed intermediate wall disposed within said housing and spaced therefrom so as to form a first space between itself and said housing, said intermediate wall

being made of a non-metallic, heat resistant material which will not catalyze the formation of undesired reaction products;

c. an enclosed inner wall disposed within said intermediate wall and spaced therefrom with a second space formed between said intermediate wall and said inner wall, said inner wall defining the reaction chamber, said inner wall also being of a non-metallic, heat resistant material which will not catalyze the formation of undesired reaction products;

d. means for coupling the inlet for raw materials directly into one end of said reaction chamber and;

e. at least one first opening in said intermediate wall at the portion thereof closest to said one end of said reaction chamber so as to permit said first and second spaces on opposite sides thereof to be in communication with each other;



f. means for coupling the outlet for the gas to said first space;

g. at least one second opening in said inner wall permitting communication between said reaction chamber and said second space at the other end of said reaction chamber, whereby raw materials will flow through said reaction chamber and product gas will flow out of said second opening into said second space, through said second space to said first opening and then to said first space, after which it will flow to said outlet for the product gas whereby the flow of said product gas exiting said reaction chamber along said inner wall will be in a heat exchanging relationship with the raw material gas flowing through said chamber to aid in the reaction, with said product gas being cooled at the same time.

4,018,574

PROCESS FOR THE MANUFACTURE OF ENDLESS COATED ABRASIVE ARTICLES

Hugh N. Dyer, Loundonville, N.Y., assignor to Norton Compay, Worcester, Mass.

Filed Dec. 16, 1970, Ser. No. 98,796
Int. Cl.² B24D *11/02, 11/06*
U.S. Cl. 51—295 **4 Claims**

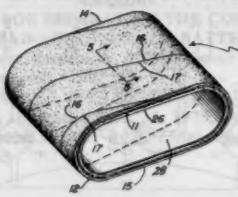
1. Process for the manufacture of an endless coated abrasive article comprising the following steps:

a. cutting a coated abrasive material at a first location along the longitudinal edge at an angle to the length direction thereof such that the length of the cut edge is equal to the circumference of the article to be fabricated.

b. cutting said material at a second location along said longitudinal edge and at a predetermined distance from said first location so as to provide a second cut edge parallel to said first cut edge thereby forming a strip of abrasive material having the shape of a parallelogram;

c. winding said strip of abrasive into a spiral comprising a plurality of coils having the abrasive surface on the outside of said coils whereby said longitudinal edge is in abutting engagement with the other longitudinal edge of the parallelogram, said spiralled abrasive strip having an inner and outer periphery;

d. rotating said spiralled abrasive strip about its own axis while said strip is rotating



e. applying to said inner periphery smooth, uniformly thick, a resinous composition whereby said composition forms a continuous layer on the inner periphery of the coiled strip of abrasive material; and

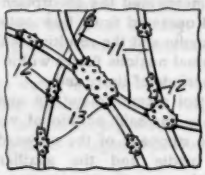
f. curing said resinous composition thereby providing an endless coated abrasive article of unitary construction and of greater width than said strip of abrasive material.

4,018,575

LOW DENSITY ABRASIVE ARTICLE

John E. Davis, Maplewood, and Thomas R. McAvoy, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 18, 1974, Ser. No. 451,995
Int. Cl.² B24D *11/02*
U.S. Cl. 51—295 **9 Claims**



1. A low-density abrasive article, especially suited for scouring steel griddle surfaces without causing undesirable surface roughness thereto, comprising in combination:

1. a lofty, open, low-density, fibrous web having a void volume of 92 to 98% and being formed of a multitude of curved substantially continuous filament bundles disposed in substantially parallel planes one on another to form a web on the order of 2 to 10 mm thick, said filament bundles being about 150–250 denier and being comprised of a plurality of minute flexible glass filaments;

2. a relatively soft resinous prebonding composition having a Knoop hardness value no greater than about 4 thoroughly impregnating the glass filament bundles sufficient to bond them together at their points of intersection and form a prebonding interface between a hard thermoset resin and said glass filament bundles;

3. dispersed throughout said web and securely adhered to the exposed surface of said filament bundles, abrasive particles having an average particle size in the range of 40 to 250 microns;

4. a hard thermoset resin having a Knoop hardness value of at least 15 dispersed throughout and adhered to the filaments and abrasive particles.

4,018,576

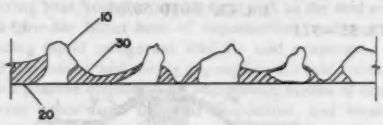
DIAMOND ABRASIVE TOOL

James T. Lowder, and Edwin M. Tausch, both of Worthington, Ohio, assignors to Abrasive Technology, Inc., Columbus, Ohio

Division of Ser. No. 388,131, Aug. 14, 1973, Pat. No. 3,894,673, which is a continuation-in-part of Ser. No. 195,705, Nov. 4, 1971, abandoned, and Ser. No. 387,943, Aug. 13, 1973, abandoned, which is a division of Ser. No. 195,705,. This application May 8, 1975, Ser. No. 575,715

Int. Cl.² B24D 3/06; C04B 31/16

U.S. Cl. 51—309 R 4 Claims



1. A diamond abrasive tool comprising, in combination, a metal substrate and a monolayer of diamond crystals bonded on said substrate by a braze alloy comprising approximately 60 to 92 percent by weight of one of the metals selected from the group consisting of nickel and cobalt or mixtures thereof and no more than approximately 12 percent of one or more of the elements selected from the group consisting of boron, silicon and phosphorous and a chromium content between at least approximately 2 to approximately 30 percent by weight, said tool characterized by a configuration wherein the braze alloy bond has its minimum depth at a point intermediate adjacent crystals.

4,018,577

PARTICLE CHARGING DEVICE FOR USE IN AN ELECTRIC DUST COLLECTING APPARATUS

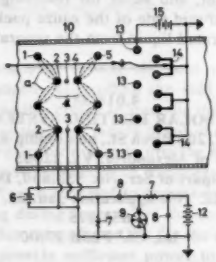
Akira Shibuya, Koganei, and Yoshifumi Nitta, Yokohama, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 15, 1974, Ser. No. 460,762

Claims priority, application Japan, Apr. 23, 1973, 48-45065

Int. Cl.² B03C 3/38

U.S. Cl. 55—137 2 Claims



1. An electrical dust collecting apparatus comprising:

a housing including a gas inlet at one end for receiving a dust containing gas, and a gas outlet at an end of said housing remote from said inlet;

a charging section positioned in said housing adjacent said one end for electrically charging dust particles entering said inlet, said charging section comprising a plurality of spaced ion generating electrodes positioned in said housing to extend across the flow path of gas through said housing, a plurality of pairs of opposite electrodes positioned in said housing to extend across the flow path of gas through said housing such that each ion generating electrode is positioned intermediate a pair of said opposite electrodes, said opposite electrodes spaced from said ion generating electrodes, a plurality of transfer electrodes positioned in said housing to extend across the flow path of gas through said housing in alternately spaced relationship to said opposite and ion generating electrodes with a first row of transfer electrodes positioned in spaced relationship on the inlet side of said opposite electrodes and a second row of transfer electrodes positioned in spaced relationship on the outlet side of said opposite electrodes, power supply means coupled to said ion generating electrodes to ionize gas between said ion generating electrodes and said opposite electrodes, and additional power supply means coupled between said opposite electrodes and said transfer electrodes for establishing an electric field between said opposite electrodes and said transfer electrodes to attract ions toward said transfer electrodes; and

a collecting section positioned in said housing for collecting dust particles electrically charged in said charging section, said collecting section positioned between said charging section and said outlet and including a plurality of spaced field forming electrodes positioned in said housing to extend across the flow path of gas through said housing, a plurality of spaced collector electrodes positioned in said housing on a side of said field forming electrodes spaced toward said outlet, and further power supply means coupled between said field forming electrodes and said collector electrodes for establishing an electrical field therebetween for applying a force to electrically charged dust particles to cause said charged particles to be collected by said collector electrodes.

4,018,578

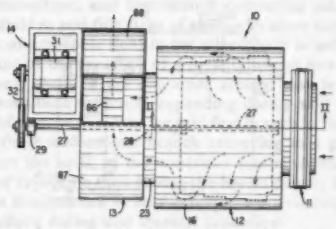
ELECTROSTATIC PRECIPITATOR

Willard K. Ahlrich, 321 N. Pine Lake Road, Stuart, Fla. 33484

Filed May 1, 1975, Ser. No. 573,570

Int. Cl.² B03C 3/00

U.S. Cl. 55—138 9 Claims



1. In an electrostatic precipitator apparatus including housing means having inlet and outlet opening means, a precipitator member disposed in the housing means and positioned in the flow path between said inlet and outlet opening means, the precipitator member having a plurality of annular, axially spaced apart, parallel collector plates, said collector plates each having a central opening therethrough, the central openings of said collector plates being aligned to define an axially elongated gas receiving space surrounded by said plurality of collector plates, said inlet opening means being disposed adjacent one end of said plurality of collector plates and in communication with the gas receiving space whereby a particle-laden gaseous stream can be supplied into said gas receiving space and then flow outwardly through channels defined between the collector plates for discharge through said outlet opening means, an end member disposed adjacent the other end of said plurality of plates for closing the other end of said space, ionizing means disposed within said inlet opening means for ionizing the particles in the gaseous stream flowing therethrough, means for electrically insulatedly supporting alternate ones of said collector plates from the others of said collector plates, and electrical connection means for supply-

ing voltage to said alternate collector plates and said ionizing means, comprising the improvement wherein all of said collector plates have substantially equal surface areas and are substantially uniformly axially spaced apart so that electrostatic fields of substantially equal intensity are created between each adjacent pair of collector plates for removing the ionized particles from the gaseous stream as it flows outwardly through the channels defined between the collector plates, and wherein the central openings of said collector plates are of decreasing diameter as the plates extend from said one end thereof to the other end thereof so that said axially elongated gas receiving space decreases in cross-sectional area as it extends from said inlet opening means to said end member so that substantially uniform quantities of the gaseous stream flow outwardly through all of the channels.

4,018,579

APPARATUS FOR PRODUCING DRY COMPRESSED AIR

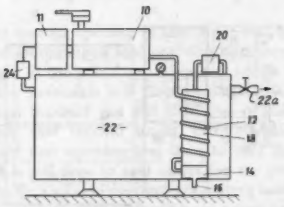
Hans-Joachim Hofmann, Geradstetten, Germany, assignor to Durr - Dental KG, Germany

Filed Apr. 18, 1975, Ser. No. 569,450

Claims priority, application Germany, Apr. 20, 1974, 2419178; Switzerland, Apr. 10, 1975, 4548/75

Int. Cl.² B01D *50/00*

U.S. Cl. 55—213 **20 Claims**



1. Apparatus for producing dry compressed air comprising a dry compressed air storage container, means for delivering dry compressed air from said storage container to a point of use, a source of compressed air for supplying compressed air to said storage container, flow connection means connecting said source to said storage container to supply compressed air from said source to said storage container, filter means including an adsorption filter disposed in said connection means between said source and said storage container for filtering and drying the compressed air supplied from said source to said storage container, means responsive to pressure in said storage container for discontinuing the supply of compressed air from said source to said storage container when the pressure in said storage container reaches a predetermined value, a valved controlled discharge outlet in said flow connection means between said adsorption filter and said source, and control means for effecting reverse flow of air from said storage container back through said adsorption filter and said discharge outlet to the atmosphere when the supply of compressed air from said source is discontinued to regenerate said adsorption filter, said control means comprising valve means responsive to the moisture content of compressed air in said storage container to effect said reverse flow only when the moisture content of said air is also a predetermined value.

4,018,580

SEPARATOR FOR SEPARATING LIQUID DROPLETS FROM A STREAM OF GAS

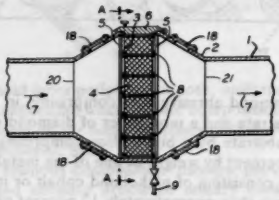
Armin Bürkholz, Cologne, and Wolfgang Dieter Müller, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 341,439, March 15, 1973, abandoned. This application Sept. 16, 1974, Ser. No. 506,625

Claims priority, application Germany, Mar. 20, 1972, 2215679; Netherlands, Mar. 27, 1973, 7304266; Belgium, Mar. 29, 1973, 129414; France, Mar. 30, 1973, 73.11677; Japan, Mar. 27, 1973, 48-34201; United Kingdom, Mar. 28, 1973, 14861/73; Canada, Mar. 28, 1973, 167416

Int. Cl.² B01D *50/00*

U.S. Cl. 55—321 **13 Claims**



1. A separator for separating liquid droplets from a gas stream comprising:

a. a horizontally extending pipe section having a pipe inlet and a pipe outlet for passage of said gas stream therethrough, having a gauze packet disposed in the pipe section substantially vertically across the flow path through the pipe for separating of liquid from gas passing through the pipe,

b. at least one discharge channel extending across the gauze packet disposed at an intermediate level in the gauze packet for receiving the liquid separated by the gauze above the discharge channel and conveying the liquid transverse to the direction of gas flow to the side of the gauze packet, said discharge channel being inclined at an angle to the horizontal for facilitating said conveyance,

c. and a second outlet from the pipe section, said second outlet communicating with the lowermost part of the gauze packet, and being for receiving separated liquid conveyed to said side of the gauze packet and discharge of the separated liquid from the separator.

4,018,581

SOLAR HEATING SYSTEM

John Denis Ruff, 206 Birch St., and Phillip Rood Wheeler, 209 Pine St., both of Alexandria, Va. 22305

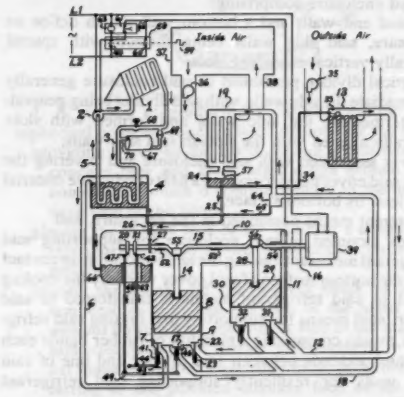
Continuation-in-part of Ser. No. 533,630, Dec. 17, 1974, Pat. No. 3,960,322. This application Jan. 22, 1976, Ser. No. 651,275

Int. Cl.² F25B *27/00*

U.S. Cl. 62—2 **1 Claim**

1. In combination, means of circulating a flow of circulating liquid, and means of heating the said flow of circulating liquid by solar radiation to a sensible temperature greater than the sensible temperature of the outside heat sink, and a boiler means of causing liquid refrigerant to boil to a vapor, and means of causing the said flow of circulating liquid to heat the said boiler means, and means of introducing the said vapor into a cylinder, and the said means of introducing including a primary inlet valve, and a piston which is moved in the said cylinder by pressure from the said vapor when the said pressure is adequate to cause this movement, and means of connecting the said piston to a crankshaft so that the movement of the said piston under the influence of the said pressure causes rotation of the said crankshaft in the function of a heat engine, and means of controlling the operation of the said primary

inlet valve, and the said means of controlling being influenced by the said rotation of the said crankshaft, and the inside of a building maintained at a sensible temperature higher than the sensible temperature of the outside heat sink, and a condenser in which condensing of refrigerant vapor occurs at a sensible temperature higher than the sensible temperature of the said inside of a building, and means of exhausting the said vapor from the said cylinder to the said condenser, and means of injecting liquid refrigerant from the said condenser into the said boiler means, and an evaporator in which refrigerant liquid evaporates at a sensible temperature lower than the sensible temperature of the outside heat sink, and means of transferring heat from the outside heat sink to the said evaporator to provide latent heat of vaporization, and means of introducing liquid refrigerant into the said evaporator from the said condenser, and means of coupling the said crankshaft to drive a positive displacement compressor means of drawing refrigerant vapor from the said evaporator, and means of discharging the vapor compressed by the said positive displacement compressor means into the said condenser, and means of circulating a fluid medium to contact the said condenser so that the said fluid medium receives a heating effect from the said condenser, and means of circulating the said fluid medium to heat the said inside of a building, and an



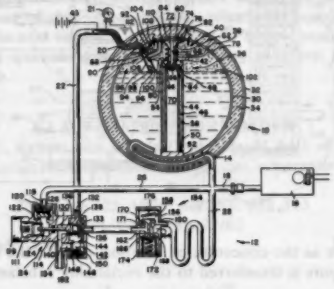
electric motor means of driving the said crankshaft, and means of automatically controlling the said electric motor means to provide motive power to start the motion of the said function of a heat engine, and means of automatically controlling the said electric motor means to provide motive power to drive the said positive displacement compressor means when the said heating effect is required to cause heating of the said inside of a building during times when the sensible temperature in the said boiler means is too low for the said function of a heat engine to provide sufficient power to drive the said compressor means fast enough to provide the said heating effect in sufficient quantity to keep the said inside of a building heated to a pre-determined sensible temperature, and a secondary inlet valve means of conducting vapor flow from the said evaporator into the said cylinder during times when the sensible temperature of the said flow of circulating liquid is lower than the sensible temperature of the outside heat sink, and means of causing the said motor means to drive the said crankshaft during the said times when the sensible temperature in the said boiler is too low, and means of employing the said crankshaft to drive the said piston in the said cylinder in the alternate function of a compressor which assists the said positive displacement compressor means when the said motor means is driving the said crankshaft.

4,018,582

VENT TUBE MEANS FOR A CRYOGENIC CONTAINER

Duane E. Hinds, and Richard C. Ankney, both of Davenport, Iowa, assignors to The Bendix Corporation, South Bend, Ind.

Filed Mar. 29, 1976, Ser. No. 671,196
Int. Cl.² F17C 7/02
U.S. Cl. 62—50 **11 Claims**



1. In a container means for storing a cryogenic fluid, said cryogenic fluid initially possessing a uniform temperature and density in a first stage of storage, said cryogenic fluid separating into stratified layers of cryogenic fluid each of which has a different density and temperature resulting from thermal expansion of the initial cryogenic fluid in a second stage of storage, the layer of cryogenic fluid adjacent a gravitational top of the container means having the lowest density and the highest temperature, relief means for communicating the container means to the atmosphere to minimize the loss of cryogenic fluid during said second stage of storage, said relief means comprising:

vent tube means having a first branch and a second branch for communicating cryogenic fluid through a vent port to the atmosphere, said first branch contacting said cryogenic fluid in said first stage of storage to allow communication of cryogenic fluid to the atmosphere to inform an operator of the presence of a predetermined quantity of cryogenic fluid in the container means, said layers of cryogenic fluid thermally expanding during said second stage of storage to submerge said first branch in the cryogenic fluid, said second branch extending to a position adjacent the apex of the container means to allow the layer of cryogenic fluid having the lowest density and the highest temperature to be the first communicated to the atmosphere during said thermal expansion.

4,018,583

REFRIGERATION HEAT RECOVERY SYSTEM

Marvin M. Patnode, Georgetown, and Louis H. Leonard, Dewitt, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 599,518, July 28, 1975, which is a continuation-in-part of Ser. No. 523,625, Nov. 14, 1974, abandoned. This application May 24, 1976, Ser. No. 689,012
Int. Cl.² F25B 15/00, 1/00
U.S. Cl. 62—101 **11 Claims**

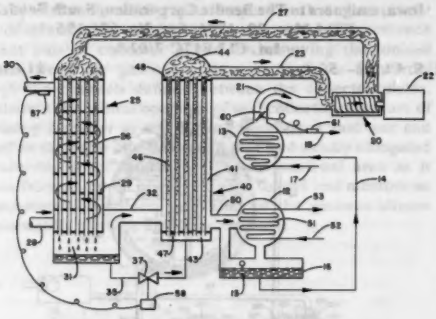
1. The method of developing a high temperature lift within the working fluid employed in a vapor compression refrigeration system wherein the suction side of the compressor is operatively connected to an evaporator including the steps of

exposing refrigerant moving from the evaporator through the compressor to a concentrated absorbent solution whereby a mixture of refrigerant vapor and solution is discharged from the compressor,

delivering the mixture discharged from the compressor into a heat exchanger, and

bringing a heat reclaiming substance into heat transfer

relationship with the mixture within the exchanger whereby high temperature energy developed in the mixture as the concentrated solution absorbs the refrigerant vapors is transferred to the reclaiming substance.

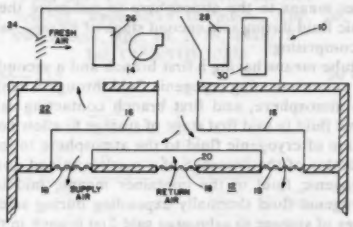


4,018,584

AIR CONDITIONING SYSTEM HAVING LATENT AND SENSIBLE COOLING CAPABILITY

James Mullen, Marshalltown, Iowa, assignor to Lennox Industries, Inc., Marshalltown, Iowa

Filed Aug. 19, 1975, Ser. No. 605,833
Int. Cl.² F25B *31/00*
U.S. Cl. 62—175 **10 Claims**



1. In an air conditioning system for an enclosure of the type having evaporator means, condenser means and multiple compressor means, said enclosure defining an enclosure air temperature, an enclosure air humidity and a cooling load, said multiple compressor means having a low flow rate and at least one high flow rate, the improvement comprising, in combination:

temperature means for sensing said enclosure air temperature, said temperature means defining at least one temperature threshold;

humidity means for sensing said enclosure air humidity, said humidity means defining a humidity threshold; and

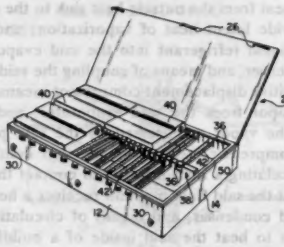
control means for operatively controlling said multiple compressor means in response to said temperature means and said humidity means, said control means being operable in a first state whenever said temperature threshold exceeds said enclosure air temperature to deactivate said multiple compressor means, said control means being operable in a second state whenever said enclosure air temperature exceeds said temperature threshold and said humidity threshold exceeds said enclosure air humidity to operate said multiple compressor means at said low flow rate, whereby said evaporator means operates at a predetermined high temperature to substantially sensibly cool said enclosure, said control means being operable in at least a third state whenever said enclosure air temperature exceeds said threshold temperature and said enclosure air humidity exceeds said humidity threshold to operate said multiple compressor means at said high flow rate, whereby said evaporator means operates at a predetermined low temperature to latently cool said enclosure.

4,018,585

COOLED OR HEATED ENCLOSURE

Robert J. Loratto, 7331 Piney Branch Road, Takoma Park, Md. 20012

Filed Sept. 4, 1975, Ser. No. 610,231
Int. Cl.² F25D *3/08*; **F24C** *15/10*
U.S. Cl. 62—372 **11 Claims**



1. A cooled enclosure comprising:

a. side and end walls and a bottom wall which define an enclosure, said side walls being formed with spaced generally vertical extending slots,

b. a vertical divider positioned in said enclosure generally intermediate the side walls, with said divider being generally intermediate the side walls and formed with slots generally aligned with the slots in said side walls;

c. a cover associated with said enclosure and covering the same, said cover being formed of a heat conductive material on a least its bottom surface,

d. refrigerant means positioned in the enclosure, and

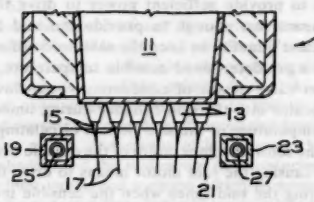
e. means mounted in said enclosure for supporting said refrigerant means and biasing the same into intimate contact with the bottom surface of said cover whereby the cooling effect of said refrigerant means is transferred to said cover; said means for supporting and biasing said refrigerant means comprising a plurality of rubber bands each of which extends between said divider and one of said side walls for resiliently supporting said refrigerant means.

4,018,586

ENVIRONMENTAL CONTROL OF BUSHING

Raymond H. Cates, Jr.; Walter L. Martin, Jr., and Sumpter D. Smith, all of Lexington, N.C., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 29, 1975, Ser. No. 644,709
Int. Cl.² C03B *37/02*
U.S. Cl. 65—2 **35 Claims**



1. In a method of forming glass filaments comprising drawing glass filaments from cones of molten glass below bushing tips in a bushing, said bushing having a bushing frame and having below said bushing tips means for removing heat in-

cluding a base cooling bar having a heat transfer fluid flowing therethrough and having connected thereto cooling fins positioned between rows of said bushing tips and being in heat transfer relationship to said base cooling bar whereby heat is removed from said bushing tips, the improvement comprising preventing short term yardage variation in the filaments by positioning and adjusting a second cooling bar, vertically spaced from said bushing frame and horizontally spaced from said bushing tips and said fins, flowing a heat transfer fluid through said second cooling bar whereby said second cooling bar removes heat from said bushing tips, said vertical and horizontal spacings being sufficiently adjusted to provide an airstream over said cooling bar and in contact with said bushing tips to therby prevent said short term yardage variation.

4,018,587

METHOD FOR PRODUCING A CURVED GLASS DIE HAVING AN ASPHERICAL POLISHED CONCAVE FACE

Bernard Maitenaz, La Varenne Saint Hilaire, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville-le-Pont, France

Filed Mar. 25, 1975, Ser. No. 562,038

Claims priority, application France, Mar. 29, 1974, 74.11177

Int. Cl.² C03B 9/14, 21/00; G02B 1/00; B29D 11/00

U.S. Cl. 65—17 **6 Claims**

1. A method of producing a curved glass die having an aspherical polished concave face, comprising the steps of:

providing a curved die blank having a polished spherical concave face and an at least rough ground aspherical convex face which is complementary to the desired concave face of the blank;

placing the convex face of the blank of a shaping block of refractory material having a spherical concave support surface; and

heating the blank and the shaping block at a sufficient temperature to enable the glass of the blank to deform without flowing until the convex face of the blank rests on said concave support surface and conforms to the spherical shape of said concave support surface, thereby transferring to the polished concave face of the blank the curve that was initially on the convex face of the blank.

4,018,588

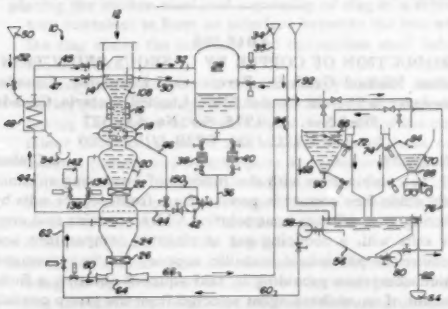
METHOD AND APPARATUS FOR HANDLING SLAG HANDLING

Charles R. Hardy, Jr., Norristown, Pa., assignor to Ecolaire Incorporated, Philadelphia, Pa.

Filed May 10, 1976, Ser. No. 684,608

Int. Cl.² C03B 18/00, 37/00

U.S. Cl. 65—19 **10 Claims**



1. Slag handling apparatus comprising an upright refractory lined quenching tank for continously receiving slag at its upper end, means for fracturing slag by use of a high pressure jet of water in said tank, a grinder below and communicating with said tank for continuously receiving and grinding the fractured slag, a first vessel below and communicating with said grinder for receiving ground slag, a second vessel located below and communicting with said first vessel, valve means between said vessels for controlling flow of slag therebetween, another valve means controlling the outlet from the lower end of said second vessel, valved conduit means for selectively venting one of said vessels and for selectively equalizing the pressure in said vessels, and an overflow tank communicating with said quenching tank for receiving overflow of water therefrom.

4,018,589

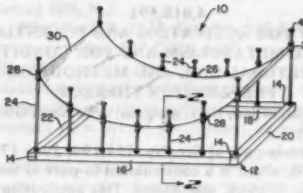
GLASS SHAPING FORM MOLD

William D. Egbert, and Wilson C. McDonald, both of Phoenix, Ariz., assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Jan. 22, 1976, Ser. No. 651,313

Int. Cl.² C03B 23/02

U.S. Cl. 65—287 **5 Claims**



1. A form for shaping planar sheets of glass into curvate configurations, comprising:

a base having opposed spaced apart sides;

a first plurality of horizontal support members having a trunnion affixed to each of two ends thereof;

a second plurality of threaded rods, rotatable within and extending upwardly from said spaced apart sides of said base and having a trunnion fitting threaded thereon, said support members extending between pairs of said rods on opposite sides of said base and wherein the trunnions of each of said support members engage the trunnion fittings of the associated rods;

clamps affixed to each of the two ends of said support members; and

a full contact flexible mold plate maintained upon said support members and secured about its periphery by said clamps.

4,018,590

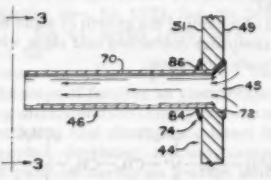
FLUID SPRAYING APPARATUS FOR TEMPERING GLASS SHEETS

Vaughn R. Imler, Valencia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 26, 1976, Ser. No. 670,595

Int. Cl.² C03B 27/00

U.S. Cl. 65—348 **4 Claims**



1. Apparatus for tempering glass sheets comprising a pair of spaced, opposed plenum chambers, each having an apertured wall with a front surface facing a glass sheet occupying position and a rear surface facing the interior of said plenum

chamber and a plurality of replaceable nozzles extending through each of said apertures forward toward said glass sheet occupying position, means for supplying fluid under pressure to said plenum chamber for discharge through said nozzles toward the surface of a hot glass sheet at a rate sufficient to impart at least a partial temper to said glass sheet when the latter occupies said position, each said nozzle having a first portion extending from said apertured wall toward said position and a second portion within said apertured wall, said second portion being flared, each of said apertures having a flared inner portion constructed and arranged to receive said flared second portion of its associated nozzle in abutting relation with said flared inner portion of said apertured wall, the application of fluid under pressure into said plenum chamber forcing said flared second portion of said nozzles against the respective flared inner portions of said apertured wall, and resilient clip means friction-fitted around said first portion of each nozzle and engaging said front surface of the apertured wall so as to maintain said abutting relationship between the flared second portion of the nozzle and the respective flared aperture and to secure the first portion of said nozzles in an orientation extending normal to said apertured wall.

4,018,591

PRODUCT FOR ACTIVATING AND POTENTIATING VEGETABLE METABOLISM AND FOR CONDITIONING AGRICULTURAL SOIL AND METHOD FOR THE PREPARATION THEREOF

Luigi Buttarelli, Milan, Italy, assignor to Prodotti Gianni S.r.l., Milan, Italy

Continuation-in-part of Ser. No. 154,194, June 17, 1971, abandoned, which is a continuation-in-part of Ser. No. 780,913, Dec. 3, 1968, abandoned. This application Dec. 11, 1974, Ser. No. 531,703

Int. Cl.² C05F *11/00*

U.S. Cl. 71—23 **11 Claims**

1. A viscous oily product for conditioning and potentiating vegetation and for fertilizing soils obtained by combining under stirring an organic substance, selected from the group consisting of lignin, obtained by the alkaline processing of wood into wood pulp, and of lignin derivatives, with a lower aliphatic alkanolamine selected from the group consisting of mono-; di-, and tri-ethanolamine, and mono-, di-, and tri-isopropanolamine, and their mixtures, to get a uniform distribution of the components, the weight ratio between the two reagents being between 1 to 10 and 1 to 1, the reaction being effected at a temperature between room temperature and 55° C, until a total solution is obtained, the product having alkaline reaction, and having the characteristic of being capable of absorbing oxygen and evolving ammonia, when exposed to air, and dissolving a metal selected from the group consisting of copper, zinc, cadmium, manganese, bismuth, cobalt, iron, vanadium, nickel and tin, in the reaction product.

4,018,592

METHOD OF CONTROLLING THE GROWTH OF ALGAE

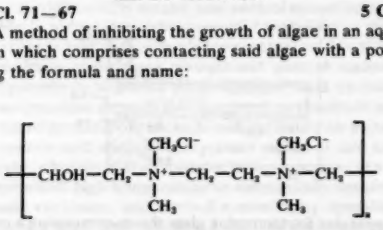
Stanley J. Buckman, and Gerald D. Mercer, both of Memphis, Tenn., assignors to Buckman Laboratories, Inc., Memphis, Tenn.

Filed July 21, 1975, Ser. No. 597,602

Int. Cl.² A01N *9/20*

U.S. Cl. 71—67 **5 Claims**

1. A method of inhibiting the growth of algae in an aqueous system which comprises contacting said algae with a polymer having the formula and name:



(Poly [2-hydroxyethylene(dimethyliminio)ethylene(dimethyliminio)methylene dichloride])-prepared by reacting epichlorohydrin and hydrochloric acid with N,N,N′,N′- tetramethylethylenediamine in an aqueous medium wherein *n* is an integer varying from 4 to 40 in an amount sufficient to inhibit the growth of said algae.

4,018,593

PROCESS FOR RECOVERING USEFUL SUBSTANCES FROM CULTURE MEDIA

Hans Müller, Im Allmendli, 8703 Erlenbach, Switzerland

Continuation-in-part of Ser. No. 584,020, June 4, 1975. This application June 19, 1975, Ser. No. 588,472

Claims priority, application Switzerland, June 7, 1974, 7469/74; Apr. 9, 1975, 4600/75; June 21, 1974, 8653/74

Int. Cl.² A01N *5/00*

U.S. Cl. 71—76 **12 Claims**

1. A process for recovering at least one member of the group consisting of proteins, enzymes, growth inhibitors, growth factors and other substances which are usable in the cultivations of microorganisms from culture media, comprising cultivating a microorganism in a liquid-containing culture medium so as to obtain a protein-containing cellular product; recovering said product from said culture medium; treating the liquid portion of said culture medium so as to obtain a first protein-containing fraction and a second fraction which is substantially free of protein and contains a growth inhibitor for said microorganism which is useful in the cultivation of green plants; and recovering said growth inhibitor from said second fraction.

4,018,594

SUSTAINED RELEASE POLYMERS

Izhak Blank, Haifa, Israel, assignor to Hydrophilics International, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 279,888, Aug. 11, 1972, Pat. No. 3,959,237. This application Feb. 6, 1975, Ser. No. 547,488

Claims priority, application United Kingdom, Aug. 12, 1971, 37936/71

Int. Cl.² A01N *9/00*

U.S. Cl. 71—97 **5 Claims**

1. In an agricultural fine chemical composition, the improvement which comprises employing as the copolymeric carrier from a film of which an effective amount of the agricultural fine chemical is releasable:

a copolymer derived from a monomer mixture selected from the class consisting of acrylic acid, from 20 to 70 parts of at least one member selected from the class consisting of lower alkyl acrylates and lower alkyl methacrylates, and from 5 to 20 parts of a long chain ester of acrylic acid or methacrylic acid, where the chain length is from 8 to 18 carbon atoms in the ester portion, said copolymer having a molecular weight of more than one million as determined by its intrinsic viscosity in methylethyl ketone at 25° C, in which at least some of the acid groups have been neutralized by multivalent inorganic cations selected from the class consisting of zinc and copper.

4,018,595

PRODUCTION OF COPPER BY GASEOUS REDUCTION

Roman Michael Genik-Sas-Berezowsky, Edmonton, Canada, assignor to Sherritt Gordon Mines Limited, Ontario, Canada

Filed Nov. 28, 1975, Ser. No. 636,327

Int. Cl.² C22C *1/04*; C22B *1/10, 15/00*

U.S. Cl. 75—.5 A **6 Claims**

1. In combination with the process of producing substantially oxide free copper in powder form from copper salts by reacting an acidic aqueous solution which contains said copper salts with a reducing gas at elevated temperature and pressure to precipitate metallic copper, the improvement, which comprises providing in said aqueous solution a finite amount of an addition agent selected from the group consisting of polymeric polyamine compounds having amino group linked by alkyl groups having 2 to 4 carbon atoms.

4,018,596

HIGH SHRINKAGE POWDER BODY

David Myers Llewelyn, Swansea, Wales, assignor to The International Nickel Company, Inc., New York, N.Y.

Division of Ser. No. 467,127, May 6, 1974, Pat. No. 3,918,955. This application July 16, 1975, Ser. No. 596,570

Claims priority, application United Kingdom, May 15, 1973, 22961/73

Int. Cl.² B22F 9/00

U.S. Cl. 75—.5 AA 3 Claims

1. As a new article of manufacture, a body of carbonyl nickel particles characterized by a carbon content up to 0.03%, a Fisher particle size up to about 1.9 microns and a shrinkage on sintering 20 minutes at 900° C typically about 25%.

4,018,597

RARE EARTH METAL SILICIDE ALLOYS

John O. Staggers, Downington, Pa., assignor to Foote Mineral Company, Exton, Pa.

Filed Aug. 5, 1975, Ser. No. 602,081

Int. Cl.² C21C 7/00; C22C 33/04, 38/00

U.S. Cl. 75—58 8 Claims

1. A rare earth metal silicide alloy comprising about 25 to about 40% rare earth metals, about 35 to about 50% Si, about 5 to about 25% Fe, about 2 to about 8% Ca, about 2 to about 4% Ba and about 1 to about 3% Sr, the proportions based on the weight of the alloy.

4,018,598

METHOD FOR LIQUID MIXING

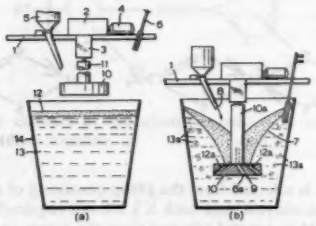
Frank Markus, Burlington, Canada, assignor to The Steel Company of Canada, Limited, Hamilton, Canada

Division of Ser. No. 527,026, Nov. 25, 1974, Pat. No. 3,961,775. This application Aug. 21, 1975, Ser. No. 606,534

Claims priority, application United Kingdom, Nov. 28, 1973, 55297/73

Int. Cl.² C21C 7/00

U.S. Cl. 75—61 5 Claims



1. A method of reducing the content of a particular substance in molten steel, comprising the steps:

placing the molten steel and a quantity of slag in a refractory container to form an interface between the two with the slag above the interface and the molten steel below the interface,

providing a refractory rotor of substantially circular outline having generally an upper face and a lower face, the rotor having a diameter of at least about one-third of the container internal diameter, the rotor having at least one internal passageway which opens at one end through the upper face at a first location adjacent the rotor axis, the other end of the passageway opening at a second location on the rotor, the second location being further from the rotor axis than is the first location,

inserting said rotor into the container sufficiently far to bring the upper face of the rotor to a location beneath the slag steel interface when the steel and slag are at rest, the axis of the rotor being generally vertical,

rotating the rotor about its axis at a speed sufficient to draw part of the interface down to the upper face of the rotor whereby slag passes into said one end of said passageway and is pumped through said passageway into said molten steel whereby the total interface area between the slag and the molten steel is increased,

and treating the slag from above with a material which preferentially reacts with said particular substance to remove same form the molten steel, whereby said material becomes a part of the slag and is brought into contact with the molten steel by virtue of the slag being pumped through the molten steel and by virtue of the total interface being in motion and of increased area, thereby to promote a reduction in the content of said particular substance in molten steel.

4,018,599

ELECTRICAL CONTACTS OF DISPERSION STRENGTHENED GOLD

James S. Hill, Cranford; Emil L. Carbone, Paramus; Victor G. Mooradian, Summit, and Walter G. Keyes, Spotswood, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Sept. 5, 1975, Ser. No. 610,526

Int. Cl.² C22C 5/02

U.S. Cl. 75—165 4 Claims

1. An electrical contact made from material comprising a mixture of substantially pure gold and CeO_2, wherein said CeO_2 comprises from 0.1 to 4.0 percent by volume of said mixture.

3. The electrical contact of claim 1 further comprising less than 1 percent by volume of one or more oxides characterized by high melting points and a high negative free energy of formation greater than — 80K cal/mole; the specific amount of said one or more oxides being dependent on the amount of percentage by weight of CeO_2 to gold, whereby any anode gain of the electrical contact of only CeO_2 and gold is substantially reduced to zero.

4,018,600

METHOD FOR ELIMINATING GAMMA$_2$ PHASE FROM DENTAL AMALGAM AND IMPROVED DENTAL AMALGAM COMPOSITION

Richard M. Waterstrat, Gaithersburg, Md., assignor to American Dental Association Health Foundation, Chicago, Ill.

Filed Sept. 29, 1975, Ser. No. 617,594

Int. Cl.² C22C 5/06, 7/00

U.S. Cl. 75—169 5 Claims

1. An improved alloy for dental amalgam consisting essentially of about 62% by weight silver, about 12% by weight manganese and the balance tin.

4,018,601

ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH PURITY NICKEL

Robert J. Hagenbach, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 834,863, June 19, 1969, abandoned. This application Nov. 18, 1971, Ser. No. 200,186

Int. Cl.² G03G 13/09, 9/14

U.S. Cl. 96—1 SD 2 Claims

1. An electrostatographic magnetic brush imaging process comprising the steps of forming an electrostatic latent image on a recording surface and developing said electrostatic latent image by contacting said electrostatic latent image with an electrostatographic developer mixture comprising finely-divided toner particles having an average particle diameter between about 1 micron and about 30 microns, said toner particles comprising tetra-(hexyl-sulfonamido) phthalocyanine, and carrier beads comprising uncoated, substantially spherical, magnetic particles consisting of at least about 98.0

percent by weight purity of nickel having an average particle diameter between about 50 microns and about 1000 microns, whereby at least a portion of said finely-divided toner particles are attracted to and held on said recording surface in conformance to said electrostatic latent image.

4,018,602

METHOD FOR IN SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE

Joseph Y. C. Chu, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 17, 1975, Ser. No. 569,131
Int. Cl.[2] G03G 5/04
U.S. Cl. 96—1.5 **5 Claims**

1. A method for in situ preparation of a photoconductive composite comprising:

a initially forming an electronically active polymeric film on a supportive substrate, said polymeric film being substantially non-photoresponsive to visible light and capable of rapid and efficient transport of only one species of charge carrier due to the presence of either an electron donor or an electron acceptor within said polymeric film;

b allowing said polymeric film to set; and

c forming a second electronically active polymeric film on said previously formed polymeric film by solvent coating the components thereof directly on the surface of the previously formed polymeric film, the electronically active component of said second polymeric film being substantially non-photoresponsive to visible light and capable of rapid and efficient transport of the species of charge carrier not transported by the previously formed polymeric film,

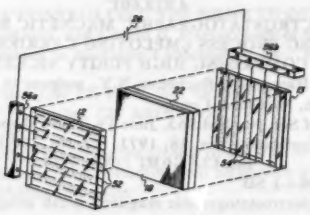
whereupon the solvent of the coating solution causes sufficient softening of the previously formed film thereby permitting charge transfer interaction of the electronically active components of each layer with the electronically active components of the other layer, the extent of such charge transfer interaction being sufficient to enable formation of a charge transfer complex having an optical density of greater than about 0.3 and yet insufficient to create a charge transfer complex zone thicker than about 2 microns.

4,018,603

DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS

Nicholas K. Sheridon, Saratoga, Calif.; Dorian Kermisch, Penfield, and Richard F. Bergen, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,198
Int. Cl.[2] G03G 5/022
U.S. Cl. 96—1.5 **10 Claims**



1. An imaging member comprising (i) a series of contiguous layers including a layer of thermoplastic material capable of permanent surface deformation and having a volume resistivity above about 10^4 ohm-cm, a layer of elastomer material having a volume resistivity above about 10^4 ohm-cm and and a flexible conductive metallic layer sandwiched therebetween, and (ii) means in contact with the free surfaces of said contiguous layers for establishing an imagewise electric field across at least one of said thermoplastic and said elastomer layers.

8. An imaging member comprising (i) a series of contiguous layers including a layer of thermoplastic material capable of permanent surface deformation and having a volume resistivity above about 10^4 ohm-cm a flexible conductive metallic layer, and a layer of elastomer material having a volume resistivity above about 10^4 ohm-cm sandwiched therebetween and (ii) means in contact with free surfaces of said contiguous layers for establishing an imagewise electric field across at least one of said thermoplastic or elastomer layers.

4,018,604

FREE RADICAL PHOTOSENSITIVE COMPOSITIONS WITH IMPROVED SENSITIVITY AND SHELF LIFE STABILITY

Paul L. Bachman, Cleveland Heights, Ohio, assignor to Horizons Incorporated, a division of Horizons Research Incorporated, Cleveland, Ohio

Filed Jan. 14, 1976, Ser. No. 648,973
Int. Cl.[2] G03C 5/24, 1/52
U.S. Cl. 96—48 R **7 Claims**

1. In a photosensitive composition consisting essentially of:

1. at least one leuco diaryl or triaryl methane dye forming compound;

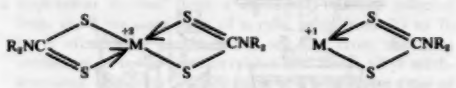
2. at lease one dye base selected from the group consisting of styryl dye bases, cyanine dye bases and merocyanine dye bases;

3. at least one organic halogen compound which provides free radicals when exposed to a suitable dose of radiation; and

a film forming polymer in which constituents (1), (2) and (3) are supported;

the improvement which comprises including in said composition an organic sulfur compound selected from the group consisting of

a. metal disubstituted dithiocarbamates represented by one of the following formula:



(Ia) (Ib)

wherein R is selected from the group consisting of alkyl, aryl, aralkyl and alicyclic and both R's are not required to be the same and M is a metal selected from the group consisting of Na^+, K^+, Zn^{+2}, Cd^{+2}, Hg^{+2}, Fe^{+2}, Ni^{+2}, Co^{+2}, Cu^{+2}, and $[BiR']^{+2}$ where R' is alkyl or aryl; and

b. metal disubstituted dithiophosphinates represented by the formula:

$$M^{+n}[-SP(OR)_2]_n \quad \text{(II)}$$

wherein n is 1 or 2 and wherein M is a metal selected from the group consisting of Na^+, K^+, Zn^{+2}, Cd^{+2}, Fe^{+2}, Ni^{+2}, Co^{+2}, Cu^{+2}, and $[BiR']^{+2}$ where R' is alkyl or aryl and each R is selected from the group consisting of lower alkyl, aryl, aralkyl, or alicyclic the amount of metal disubstituted dithiocarbamate and metal disubstituted dithiophosphinate being effective to both inhibit fog formation in said composition and to provide aging stability for amplification by optical development of said composition.

4,018,605

METAL LITHOGRAPHIC PLATE MADE IMAGEABLE BY DIFFUSION TRANSFER BY TREATMENT WITH GROUP IV-B METAL FLUORIDE

David B. Olsen, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 21, 1975, Ser. No. 569,873
Int. Cl.² G03C 5/54; G03F 7/02; B44D 1/34; B41M 5/00
U.S. Cl. 96—29 L 8 Claims

5. A process for preparing a lithographic plate comprising:

a. treating a hydrophilic-surfaced metallic support with an aqueous solution containing from about 0.01 to about 1.0 percent by weight of a water soluble Group IV-B metal fluoride compound of the formula:

$X_1X_2F_6$

wherein X_1 is hydrogen, an alkali metal, an alkaline earth metal or an ammonium cation and X_2 is a titanium, zirconium or hafnium cation at a temperature of from about 18° C to 24° C for about 5 to about 50 seconds; and

b. imaging the treated support by the silver salt diffusion transfer process.

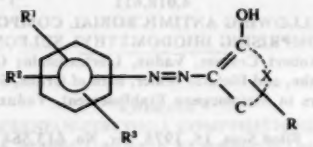
4,018,606

ORGANIC AZO PIGMENT SENSITIZERS FOR PHOTOCONDUCTIVE LAYERS

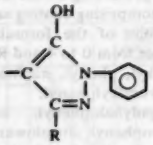
Lawrence E. Contois; Joseph Y. Kaukeinen; Stephen Michel, and Thomas M. Plutchak, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 3, 1974, Ser. No. 466,658
Int. Cl.² G03G 5/09
U.S. Cl. 96—1.7 23 Claims

1. A photoconductive composition comprising a photoconductor and a sensitizing amount of a sensitizer for the photoconductor comprising an organic pigment having the formula

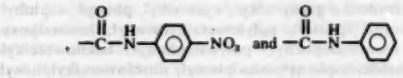


wherein X consists of the atoms necessary to complete a naphthalene, anthracene, or

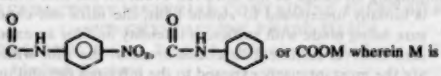


ring;

R^1, R^2, and R^3 are independently selected from the group consisting of hydrogen, halogen, alkoxy, NO_2, alkyl, SO_3H or alkali metal salts thereof, and COOH or alkali metal salts thereof;



and wherein R^2 and R^3 can comprise the atoms necessary to complete a phenyl, naphthyl or anthryl ring; and R is selected from the group consisting of



or COOM wherein M is alkyl or an alkali or alkaline earth metal.

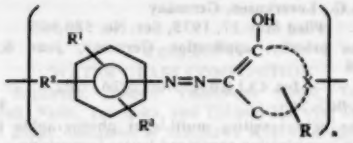
4,018,607

CRYSTALLINE ORGANIC PIGMENT SENSITIZERS FOR PHOTOCONDUCTIVE LAYERS

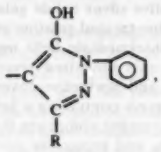
Lawrence E. Contois, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 3, 1974, Ser. No. 466,659
Int. Cl.² G03G 5/09
U.S. Cl. 96—1.7 27 Claims

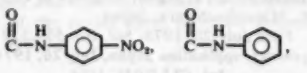
1. A photoconductive composition comprising a photoconductor and a sensitizing amount of a sensitizer for the photoconductor comprising crystallized organic pigments having the formula:



wherein n is 1 or 2; X consists of the atoms necessary to complete a naphthalene, anthracene, or



R^1,R^2, and R^3 are independently selected from the group consisting of hydrogen, halogen, alkoxy, NO_2, alkyl, SO_3H or alkali metal salts thereof, and COOH or alkali metal salts thereof; and wherein R^2 and R^3 can comprise the atoms necessary to complete a phenyl, naphthyl or anthryl ring; and R is selected from the group consisting of



or COOM wherein M is alkyl or an alkali or alkaline earth metal.

4,018,608

INFRA RED PHOTOGRAPHY WITH SILVER HALIDE FILMS USING INFRARED AND VISIBLE LIGHT EXPOSURES

Gene F. Frazier, Washington, D.C., assignor to Versar, Inc., Springfield, Va.

Filed Oct. 10, 1975, Ser. No. 621,311
Int. Cl.² G03C 5/04, 5/32
U.S. Cl. 96—27 E 10 Claims

1. The method of photographing an infra red event to provide a lasting developable latent image upon a film which is of a visible-light sensitive type having a silver halide grain suspended in an emulsion, comprising the steps of:

impinging an image of the infra red event on the film which is initially unexposed to visible light, the infra red exposure being made with sufficient intensity and for an exposure interval sufficient to excite areas of the film which are the most intensely exposed to the infra red beyond the degree of excitation which increases its sensitivity to visible light by merely warming it, to a greater degree of excitation which reduces the sensitivity of the film upon exposure to visible light by reducing the ability of the grain to form a stable latent image in the presence of the excited emulsion; and

exposing said film after it has been excited by the infra red and while still excited to a field of visible light whose intensity and duration is such as to produce a developable latent image having, when developed, graduated contrast wherein the densities are functions of the degree of excitation of said areas by the infra red exposure.

4,018,609

COLOR PHOTOGRAPHIC MULTILAYERED MATERIAL WITH LAYERS OF ACID ASHED GELATINE

Karl Lohmer, Leverkusen; Hermann Seiz, Heilbronn, and Karl Zietan, Cologne, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 27, 1975, Ser. No. 580,905

Claims priority, application Germany, June 8, 1974, 2427700

Int. Cl.² G03C *3/00, 5/26, 1/02*

U.S. Cl. 96—74 **3 Claims**

1. The light sensitive multi-layer photographic material having in combination sensitized layers comprising

a red sensitive silver halide gelatine emulsion layer which contains alkaline-treated gelatine and a cyan coupler,

a green sensitive silver halide gelatine emulsion layer which contains alkaline-treated gelatine and a magenta coupler and a blue sensitive silver halide gelatine emulsion layer containing alkaline-treated gelatine and a yellow coupler,

and at least one intermediate light insensitive layer positioned between said sensitized layers and containing a gelatine binder, and protective covering layer overlying said sensitized layers containing a gelatine binder,

wherein the improvement comprises the gelatine binder of said intermediate and protective covering layer consists essentially of inert acid-ashed gelatine having an isoelectric point of between 6.5 and 9.5.

4,018,610

SUPERSENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

Masanao Hinata; Haruo Takei; Akira Sato, and Tadashi Ikeda, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

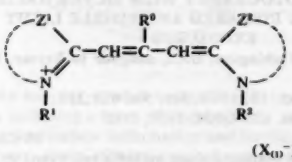
Filed July 28, 1975, Ser. No. 599,517

Claims priority, application Japan, July 26, 1974, 49-86201

Int. Cl.² G03C *1/14*

U.S. Cl. 96—124 **20 Claims**

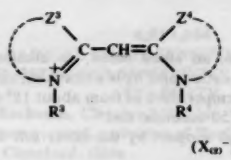
1. A spectrally sensitized silver halide photographic emulsion containing, in combination, supersensitizing amounts of at least one sensitizing dye represented by the following general formula (I)



(I)

$(X_{(1)}^-)_{n-1}$

wherein Z^1 and Z^2 each represents an atomic group necessary for completing a benzimidazole nucleus, an oxazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, a benzothiazole nucleus, a naphthothiazole nucleus, a benzoselenazole nucleus or a naphthoselenazole nucleus excepting that both of Z^1 and Z^2 do not simultaneously represent an oxazole nucleus, a benzoxazole nucleus or a naphthoxazole nucleus; R^1 and R^3 each represents an aliphatic group one of which is a sulfoalkyl group, a hydroxyalkyl group or a carboxyalkyl group and the carbon chain of which may be interrupted with an oxygen atom or a sulfur atom; R^0 represents a hydrogen atom, an alkyl group or an aralkyl group; $X_{(1)}^-$ represents an anion; and m is 1 or 2, with m being 1 when the dye forms an intramolecular salt; and at least one sensitizing dye represented by the following general formula (II)



(II)

$(X_{(2)}^-)_{n-1}$

wherein Z^3 and Z^4 each represents an atomic group necessary for completing a pyrroline nucleus, a pyridine nucleus, an indolenine nucleus, a benzimidazole nucleus, an oxazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, a thiazoline nucleus, a thiazole nucleus, a benzothiazole nucleus, a naphthothiazole nucleus, a selenazole nucleus, a benzoselenazole nucleus or a naphthoselenazole nucleus; R^3 and R^4 each represents an aliphatic group and the carbon chain of which may be interrupted with an oxygen atom or a sulfur atom, and at least one of R^3 and R^4 represents an aliphatic group containing a hydroxy group, a carboxy group or a sulfo group; $X_{(2)}^-$ represents an anion; and n is 1 or 2, with n being 1 when the dye forms an intramolecular salt.

4,018,611

NON-YELLOWING ANTIMICROBIAL COMPOSITIONS COMPRISING DIIODOMETHYL SULFONES

Charles Robert Cramer, Vaduz, Liechtenstein; Gerrit Dirk vanLenthe, and Dietmar Maier, both of Grabs, Switzerland, assignors to Metalorgana Etablissement, Vaduz, Liechtenstein

Filed Sept. 15, 1975, Ser. No. 613,564

Claims priority, application Switzerland, Sept. 17, 1974, 12588/74

Int. Cl.² C09D *5/14*

U.S. Cl. 106—15 R **37 Claims**

1. In a method for protecting a host material against attack by micro-organisms comprising coating said host material with a diiodomethyl sulfone of the formula $R(CH_2)_nSO_2CHI_2$, wherein *n* is an integer from 0 to 4 and R is selected from the group alkyl, cycloalkyl, phenyl, naphthyl, monoloweralkylphenyl, polyloweralkylphenyl, loweralkoxyphenyl, monohalophenyl, polyhalophenyl, halologweralkylphenyl, halonitrophenyl, nitrophenyl, nitroloweralkylphenyl, anilino, anilinophenyl and anilamidophenyl, the improvement comprising admixing with said sulfone a sufficient amount of a compound containing a reactive sulfide or sulfhydryl group to prevent the changing in color of the diiodomethyl sulfone.

13. In an antimicrobial composition adapted to protect a host material against attack by micro-organisms, said composition comprising a diiodomethyl sulfone of the formula $R(CH_2)_nSO_2CHI_2$, wherein *n* is an integer from 0 to 4 and R is selected from the group alkyl, cycloalkyl, phenyl, naphthyl, monoloweralkylphenyl, polyloweralkylphenyl, loweralkoxyphenyl, monohalophenyl, polyhalophenyl, halologweralkylphenyl, halonitrophenyl, nitrophenyl, nitroloweralkylphenyl, anilino, anilinophenyl and anilamidophenyl, the improvement comprising a sufficient amount of a compound containing a reactive sulfide or sulfhydryl group to prevent the changing in color of the diiodomethyl sulfone.

4,018,612

TRANSPARENT BETA-QUARTZ GLASS-CERAMICS

Kenneth Chyung, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,529
Int. Cl.² C03C 3/22, 3/04
U.S. Cl. 106—39.7 1 Claim

1. A transparent glass-ceramic article exhibiting a coefficient of thermal expansion (R.T.—600° C.) less than about 10×10^{-7}/° C., excellent chemical durability and resistance to detergent attack, an infra-red transmittance at a wave length of 2.5 microns through a polished plate of about 3 mm. thickness of in excess of 75%, and wherein beta-quartz solid solution constitutes the predominant crystal phase, said glass-ceramic article being crystallized in situ from a parent glass having a viscosity at the liquidus of at least 10,000 poises and consisting essentially, by weight on the oxide basis, of 2.5–3.5% Li_2O, 1.5–2.5% MgO, 1–2% ZnO, 17.75–20% Al_2O_3, 67–70% SiO_2, 2–4.5% TiO_2, 0-2% BaO, and 1–2% ZrO_2, and wherein alkali metal oxides other than Li_2O, alkaline earth metal oxides other than MgO and BaO, and B_2O_3 are essentially absent therefrom.

4,018,613

DIODE ENCAPSULATION GLASS

Francis W. Martin, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,871
Int. Cl.² C03C 3/10
U.S. Cl. 106—53 1 Claim

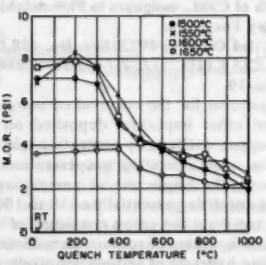
1. A glass suitable for the manufacture of glass tubing for diode encapsulation consisting, in weight percent, of about 65% PbO, 27% SiO_2, 4% K_2O, 2% Al_2O_3, and 2% B_2O_3, said glass having a softening point of about 530° C., and an average linear coefficient of thermal expansion (25°–300° C.) of about 90×10^{-7}° C.

4,018,614

CELSIAN-ZIRCONIA COMPOSITIONS

Lawrence A. Nordlie, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,632
Int. Cl.² C04B 35/48
U.S. Cl. 106—57 5 Claims



1. A refractory, thermal shock resistant, sintered ceramic composition consisting essentially of 30–90% celsian and 10–70% zirconia by weight.

4. A microcracked, sintered ceramic composition having a melting temperature above about 1650° C and consisting essentially of, on the oxide basis by weight, 12.3–36.8% BaO, 8.1–24.5% Al_2O_3, 9.6–28.8% SiO_2, and 10–70% ZrO_2 and having celsian and zirconia as the predominant phases.

4,018,615

REFRACTORY MATERIAL CONTAINING FUSED SILICA AND CRYSTALLINE PHASE SILICA

David Mills, Bristol, England, assignor to Rolls-Royce (1971) Limited, England

Filed Nov. 3, 1975, Ser. No. 628,404
Claims priority, application United Kingdom, Nov. 20, 1974, 50216/74
Int. Cl.² C04B 35/14
U.S. Cl. 106—69 7 Claims

1. A method of manufacturing a refractory article comprising fused silica and crystalline phase silica comprising the steps of intimately mixing finely divided particles of fused silica and crystalline phase silica wherein said mixture contains about 36.3% to 70% by weight of crystalline phase silica based on the total silica, molding the intimate mixture to the required shape and heating the molded intimate mixture at a temperature sufficiently high enough to sinter the particles of fused silica and crystalline phase silica, but not high enough to cause rapid crystallization of the fused silica.

4,018,616

WATER GLASS COMPOSITION

Yujiro Sugahara, Tokyo; Yoshibumi Noshi, Tsuruoka; Niroyuki Naito, Tsuruoka, and Takashi Maruya, Tsuruoka, all of Japan, assignors to Mizusawa Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sept. 11, 1975, Ser. No. 612,448
Claims priority, application Japan, Sept. 13, 1974, 49-104893; Sept. 13, 1974, 49-104894
Int. Cl.² C04B 35/16
U.S. Cl. 106—74 22 Claims

1. A water glass composition comprising a water-soluble or water-dispersible silicate binder and an inorganic phosphate curing agent, wherein said inorganic phosphate curing agent is composed of an inorganic solid fine powder comprising as the main ingredient a silicon poylphosphate or its metal salt and said curing agent has an initial dissolution amount (B) of up to 200 mg and an average hydrolysis rate constant (A) of at least 0.2, said initial dissolution amount (B) and average hydrolysis rate constant (A) being defined by the following formula:

$$Y = AX + B$$

wherein X stands for the lapse of time (minutes) of up to 120 minutes after 1 g of the curing agent has been added to 100 ml of a 4N sodium hydroxide aqueous solution, and Y stands for the integrated amount (mg/100 ml) of phosphoric acid dissolved out of the curing agent into said aqueous solution during the time X.

4,018,617

MIXTURE FOR PAVEMENT BASES AND THE LIKE

J. Patrick Nicholson, Toledo, Ohio, assignor to Nicholson Realty Ltd., Sylvania, Ohio

Filed Feb. 2, 1976, Ser. No. 654,211
Int. Cl.² C04B 7/26
U.S. Cl. 106—85 8 Claims

1. A mixture consisting essentially of fly ash in an amount between about 6 and 24% by dry weight, cement kiln dust in an amount between about 4 and 16% by dry weight, and aggregate in an amount between about 60 and 90% by dry weight, which through reactions produces a hard, strong, durable mass capable of supporting surfacing.

4,018,618
MONO- AND/OR DI-ALKYL PHOSPHATES AS ADDITIVES FOR HYDRAULIC BINDERS

Rolf Petri, Frankenthal; Harry Distler, Ludwigshafen, and Bertold Bechert, Hessheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

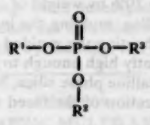
Filed Oct. 29, 1974, Ser. No. 518,628

Claims priority, application Germany, Nov. 2, 1973, 2354714

Int. Cl.² C04B 7/02

U.S. Cl. 106—90 **3 Claims**

1. Hydraulic binders containing mono- or di-alkyl phosphates of the formula



in which R^1 denotes alkyl of from 14–18 carbon atoms, R^2 denotes R^1 or hydrogen, alkali metal, ammonium or ammonium substituted by alkyl or alkanol of from 2 to 4 carbon atoms per alkyl or alkanol group and R^3 denotes hydrogen, alkali metal, ammonium or ammonium substituted by alkyl or alkanol of from 2 to 4 carbon atoms per alkyl or alkanol group, as antifoaming and hydrophobizing agents, the amount of said phosphates being from about 0.2 to 6% by weight based on the weight of the hydraulic binder.

4,018,619
HIGHLY ACTIVATED MIXTURES FOR CONSTRUCTING LOAD BEARING SURFACES AND METHOD OF MAKING THE SAME

William C. Webster, Norristown, and Charles L. Smith, Conshohocken, both of Pa., assignors to IU Technology Corporation, Miami, Fla.

Continuation of Ser. No. 508,221, Sept. 23, 1974, abandoned, which is a division of Ser. No. 285,257, Aug. 31, 1972, Pat. No. 3,385,084, which is a continuation-in-part of Ser. No. 23,887, March 30, 1970. This application Jan. 22, 1976, Ser. No. 651,457

Int. Cl.² C04B 7/34

U.S. Cl. 106—118 **5 Claims**

1. A method of producing a more reactive lime-fly ash cementitious composition, said method comprising mechanically treating a hydrated lime and fly ash pre-mixture, consisting of 4–90 weight % hydrated lime in the presence of glassy fly ash particles occurring therein, said mechanical treating comprising a process wherein said glassy fly ash particles are caused to interact mechanically with said hydrated lime to reduce the particle size of and to deagglomerate said hydrated lime, then adding to said pre-mix unactivated fly ash in an amount such that the proportion of the pre-mix in the total mix does not exceed 35% by weight.

4,018,620
METHOD OF HYDROLYZING CELLULOSE TO MONOSACCHARIDES

Ronald A. Penque, Glen Ridge, N.J., assignor to Biocel Corporation, New York, N.Y.

Filed May 19, 1975, Ser. No. 578,462

Int. Cl.² C13K 1/02

U.S. Cl. 127—37 **10 Claims**

1. A method of hydrolyzing cellulose to monosaccharides comprised of admixing cellulose, water, at least about 5% $CaCl_2$ and about 0.01% to about 2% HCl, the larger the quantity of $CaCl_2$ the lesser the quantity of HCl and heating the reaction mixture to solubilize the cellulose and until reducing sugars are formed from the solubilized cellulose.

4,018,621
METHOD FOR REMOVING SLAG CAKES FROM SYNTHESIZING GAS REACTORS

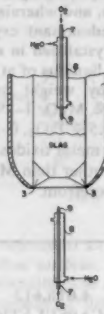
Walter Jahnentz; Friedhard Klatt, and Karl Gaupp, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Apr. 11, 1975, Ser. No. 567,118

Claims priority, application Germany, Apr. 13, 1974, 2418033

Int. Cl.² B08B 7/00

U.S. Cl. 134—5 **5 Claims**



1. A method for removing a slag cake formed in the bottom of a synthesizing gas reactor having a reactor cover located on the bottom of the reactor, comprising:

a. removing said reactor cover;

b. melting an orifice through said slag cake and the bottom of the reactor with said reactor cover removed by means of a flame from an oxygen core lance to form liquefied slag;

c. draining said liquefied slag through said orifice;

d. liquefying residual parts of said slag cake by means of an oxygen excess powered gas flame; and

e. draining said liquefied residual parts through said orifice.

4,018,622
FLUXING AGENT FOR REMOVING INORGANIC DEPOSITS FROM SMELTERS AND FURNACES

Roy E. Wright, Oakland, and Howard C. Ross, City of Commerce, both of Calif., assignors to Philadelphia Quartz Company, Valley Forge, Pa.

Filed Oct. 19, 1973, Ser. No. 408,027

Int. Cl.² C11D 7/12, 7/14, 7/20; C23G 1/28

U.S. Cl. 134—19 **10 Claims**

1. In the process for the removal of inorganic dusts, ash, dirt, slag and other impurities deposited on the walls and uptakes of copper smelters, by contacting said impurities with fluxing agents at the operating temperatures of said smelters and equipment, the improvement comprising the use of a fluxing agent consisting essentially of 10 to 100% alkali metal silicate selected from the group consisting of

a. crystalline hydrates of sodium metasilicate;

b. crystalline hydrates of sodium sesquisilicate;

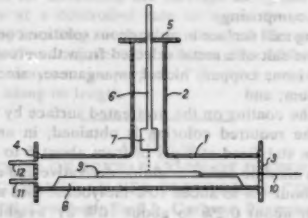
c. hydrated amorphous sodium, potassium or mixed sodium-potassium silicate powders containing 10–30% water by weight and having a mole ratio of 1.1 to 3.9 parts of SiO_2 per part of M_2O, and

d. liquid sodium, potassium or mixed sodium-potassium silicates having a mole ratio of 0.75 to 3.9 parts of SiO_2 per part of M_2O and 0 to 90% of a chemical selected from the group consisting of soda ash, ferrosilicon, silica, calcium carbide, lime and iron pyrites.

4,018,623
METHOD OF CUTTING USING A HIGH PRESSURE WATER JET

Michael John Walker, Letchworth, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 10, 1975, Ser. No. 548,808
Claims priority, application United Kingdom, Feb. 20, 1974, 7769/74
Int. Cl.² B08B 3/02
U.S. Cl. 134—21 7 Claims



1. A method of cleaning the interior of a polymerisation reactor having polymeric build-up adhering to the inside wall thereof which method comprises delivering a jet of water with hydraulic pressure of at least 70 atmospheres (68.6×10^5 N/m_2) inside the reactor onto said build-up while maintaining the entire interior of the reactor at sub-atmospheric pressure whereby the jet exerts a cutting action to remove or loosen said polymeric build-up.

4,018,624
THERMOCOUPLE STRUCTURE AND METHOD OF MANUFACTURING SAME

Silvio J. Rizzolo, Nutley, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

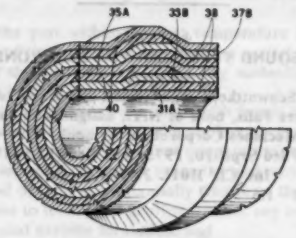
Division of Ser. No. 390,548, Aug. 22, 1973, Pat. No. 3,942,242. This application Nov. 17, 1975, Ser. No. 632,462
Int. Cl.² H01V 1/02
U.S. Cl. 136—233 19 Claims

1. A thermocouple structure comprising a pair of thermocouple wires, the wires being joined together at one end to form a thermocouple, a metallic sheath closed at one end surrounding said wires and enclosing at said one end the thermocouple of said wires, the other ends of said wires being positioned outside the open other end of said sheath, the diameter of said sheath and the separation of said sheath from said wires being smaller at said one end than at said other end, crushed compacted mineral oxide contained within said metallic sheath, said mineral oxide serving to insulate said wires from said sheath and serving to insulate one of said thermocouple wires from the other, and ceramic cement provided at the other end of said sheath from which the thermocouple wires extend, said ceramic cement serving to seal said wires within said sheath and to contain the crushed compacted mineral oxide therein.

4,018,625
THERMO-ELECTRIC ASSEMBLIES

Pietro Tinti, Via Unione Sovietica 9, Florence, Italy (I-50126)

Filed Mar. 25, 1975, Ser. No. 561,846
Int. Cl.² H01L 21/02
U.S. Cl. 136—225 2 Claims



1. A method of producing a thermo-electric assembly comprising the steps of depositing a first type of metal by vapor-phase deposition onto a rotating surface in a vacuum to form a cylindrical first metal layer,

depositing a first dielectric layer by vapor phase deposition in a vacuum onto a part of the surface of said first metal layer, said first dielectric layer extending axially from one end of said first metal layer, thereby to leave exposed a portion of said surface of said first metal surface at the opposite end thereof,

depositing a second cylindrical metal layer, of a different type than said first metal layer, by vapor-phase deposition in a vacuum, onto the surface of said first dielectric layer and said exposed portion of said surface of said first metal layer, so as to form with said exposed portion of said first metal layer a first metal-metal junction where said second metal layer contacts said exposed portion of said first metal layer,

depositing a second dielectric layer by vapor-phase deposition in a vacuum onto a part of the surface of said second metal layer, said second dielectric layer extending axially from one end of said second metal layer over a portion of said second metal layer leaving the remaining portion of said second metal layer exposed, and

depositing a cylindrical third metal layer by vapor-phase deposition in a vacuum onto said second dielectric layer and the exposed surface of said second metal layer to form a metal-metal junction where said third metal layer contacts the exposed portion of said second metal layer, the metal of the third metal layer being of the same type as the metal of the first metal layer,

said first and second metal-metal junctions being formed at alternating opposite axial ends of said cylindrical metal layers, whereby a temperature difference can be created between said junctions to generate a thermo-electric e.m.f. between said first and third metal layers.

2. A cylindrical thermo-electric assembly, comprising:

a plurality of cylindrical metal layers each extending along the axial length of said assembly and overlying each other with the metal of one of said metal layers being different than the metal of the one of said metal layers between which it is situated,

and a plurality of dielectric layers arranged between and separating the remaining parts of the surfaces of said metal layers,

said metal and dielectric layers being cylindrical in configuration, each successive dielectric layer extending axially from alternating ends of said assembly along a respective but alternately different one of said metal layers so as to terminate short of the opposite ends of said metal layers, thereby to leave exposed a portion of the underlying one of said metal layers, whereby said metal-metal junctions are formed between the exposed portion of one of said metal layers and that portion of the overlying one of said

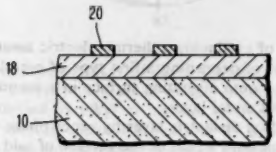
metal layers covered by an overlying one of said dielectric layers, said metal-metal junctions thus being formed at alternate axial ends of said cylindrical assembly, whereby a temperature difference may be applied between said axially spaced junctions to generate a thermo-electric e.m.f. between the outermost ones of said metal layers.

4,018,626

IMPACT SOUND STRESSING FOR SEMICONDUCTOR DEVICES

Guenter H. Schwuttke, Poughkeepsie, and Kuei-Hsiung Yang, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,164
Int. Cl.² H01L *21/304, 21/322*
U.S. Cl. 148—1.5 **11 Claims**



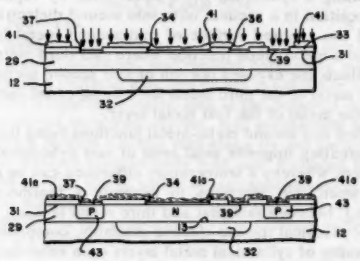
1. In the process of making semiconductor devices, the improvement comprising the steps of, placing a plurality of loose spherical shaped objects on one face of a semiconductor wafer and acoustically vibrating said wafer whereby said face is damaged in a controlled and uniform manner.

4,018,627

METHOD FOR FABRICATING SEMICONDUCTOR DEVICES UTILIZING OXIDE PROTECTIVE LAYER

Bohumil Polata, Los Altos, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Sept. 22, 1975, Ser. No. 615,483
Int. Cl.² H01L *21/265, 21/31*
U.S. Cl. 148—1.5 **2 Claims**



1. A method for fabricating semiconductor devices from a semiconductor body having a planar surface comprising the steps of forming a layer of material to be utilized as a mask on said surface, forming a plurality of openings in the layer of material to expose areas of said surface, thereafter forming a thin protective layer, relative to said mask, over each of said exposed areas and maintaining said thin protective layer throughout the fabrication steps, and thereafter selectively doping the areas defined by said openings by ion implantation and selectively covering said openings so that areas exposed are not doped until the proper time in said sequence, said thin protective layer protecting nonselected areas from residual impurity products formed during removal of said selective covering.

4,018,628

PROCESS FOR COLORING ALUMINIUM

Jean Francois Paulet, Siblingen, Switzerland, assignor to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland

Filed Oct. 17, 1975, Ser. No. 623,480
Claims priority, application Switzerland, Oct. 18, 1974, 13993/74; Oct. 7, 1975, 12997/75
Int. Cl.² C23F *7/00, 5/02*
U.S. Cl. 148—6.27 **13 Claims**

1. In a process for producing a strongly adherent, dark grey to black coating on the surface of aluminum and aluminum alloys,

the steps comprising,

pretreating said surface in an aqueous solution containing at least one salt of a metal selected from the group consisting of iron, copper, nickel, manganese, zinc, tin and chromium; and

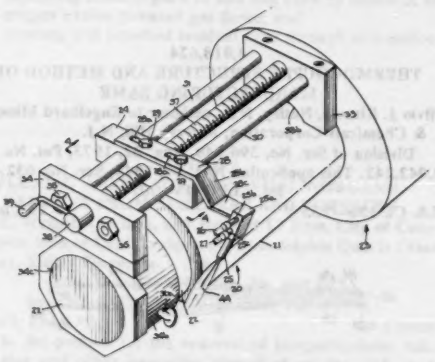
forming the coating on the pretreated surface by treating it until the required coloring is obtained, in an aqueous solution stabilized at a pH of from about 6 to about 7.5 with an alkaline amine or amine derivative and containing from about 1% to about 10% molybdate ions and a total of from about 0.2% to about 10% by weight of a salt containing fluoride and/or at least one chloride of a metal selected from the group consisting of nickel, chromium, iron, tin, zinc, copper and manganese and/or an organic chloride compound with active chlorine atoms.

4,018,629

APPARATUS AND METHOD FOR GUIDING A CUTTING TORCH

Buel Earl Dickey, Memphis, Tenn., and David Earl Johnson, Nesbit, Miss., assignors to Alco-Gravure, Inc., New York, N.Y.

Filed Jan. 9, 1976, Ser. No. 647,885
Int. Cl.² B23K *7/04*
U.S. Cl. 148—9 R **13 Claims**



1. Apparatus for guiding a cutting torch to enable the flame thereof to cut a controlled thickness of metal material from a length of the outer surface of a hollow elongated cylindrical workpiece with the interior portion thereof disposed upon a shaft extending beyond one end portion of the workpiece to enable the wall of the workpiece to be severed along the cut comprising:

a. a carriage for holding a cutting torch at a predetermined position with respect thereto;

b. means for slidably supporting the carriage for movement along a path of travel of predetermined length;

c. a pair of means for mounting the supporting means adjacent to the workpiece with the path of travel of the carriage being substantially parallel to the longitudinal axis of the workpiece, each mounting means being spaced apart from the other by a distance substantially equal to

the predetermined length of the path of the travel of the carriage and adapted to be disposed adjacent to a different opposite end of the workpiece, one of the pair of mounting means being adapted to engage the outer surface of the workpiece, the other of the pair of mounting means being adapted to engage the outer surface of the portion of the shaft extending beyond one end portion of the shaft extending beyond one end portion of the workpiece, the pair of mounting means enabling a cutting torch when supported by the carriage to have its flame directed toward the outer surface of the workpiece; and

d. means for advancing the carriage along the supporting means at a controlled rate to move the carriage and thereby a cutting torch when attached thereto along the length of and adjacent the outer surface of the workpiece to cut away a major portion of the thickness of the workpiece along its length.

4,018,630

METHOD OF PREPARATION OF DISPERSION STRENGTHENED SILVER ELECTRICAL CONTACTS

James S. Hill, Cranford; Emil L. Carbone, Paramus; Victor G. Mooradian, Summit, and Walter G. Keyes, Spotswood, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Sept. 5, 1975, Ser. No. 610,525
Int. Cl.[2] H01B *1/02;* **C22C** *1/05, 5/10*
U.S. Cl. 148—11.5 P **12 Claims**

1. The method of preparing a composition of Ag and CeO_2 comprising the steps of

preparing a powder mixture of Ag and from about 1¼ to about 2½ percent by weight of CeO_2,

consolidating said powder mixture into a solid billet, and

mechanically reducing said solid billet into an electrical contact body.

4,018,631

COATED CEMENTED CARBIDE PRODUCT

Thomas E. Hale, Warren, Mich., assignor to General Electric Company, Schenectady, N.Y.

Filed June 12, 1975, Ser. No. 586,479
Int. Cl. C22c *14/00, 16/00, 27/02, 27/04*
U.S. Cl. 148—31.5 **7 Claims**

1. The process of pretreating cemented carbide substrate containing tungsten and cobalt for the reception of wear resistant oxide coatings which comprises

a. treating the substrate in a first atmosphere selected from carbide, nitride and carbonitride forming atmospheres to form the corresponding coating of metal selected from titanium, tantalum, hafnium, zirconium, niobium and mixtures thereof on the substrate,

b. firing the coated substrate in a second, nonreactive, atmosphere at a temperature greater than the melting point of the cobalt phase to diffuse tungsten and cobalt into said coating, and

c. heating the product of (b) in a third, oxidizing, atmosphere to oxidize said coating.

5. The product of claim 1.

4,018,632

MACHINABLE POWDER METAL PARTS

Howard Schmidt, Pontiac, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 12, 1976, Ser. No. 666,519
Int. Cl.[2] B22F *3/24;* **C21D** *1/00*
U.S. Cl. 148—126 **30 Claims**

1. A method of producing machinable steel parts comprising about 0.3 to 0.5% Mo, less than about 0.45% C, less than about 0.9% Mn, balance essentrally iron from powder metal, comprising the steps:

providing a powder metal steel part,

heating the part for a time at a temperature which insures the presence of a substantially austenitic structure in the part,

cooling the part to a first temperature range below the heating temperature, the range being within that at which the part may be held for a period of time to partially transform some of the austenite formed during heating to ferrite without forming any substantial amount of carbides,

holding the part within the first temperature range for a period of time sufficient to effect the partial transformation of the austenite, the remaining austenite becoming carbon enriched as a result thereof,

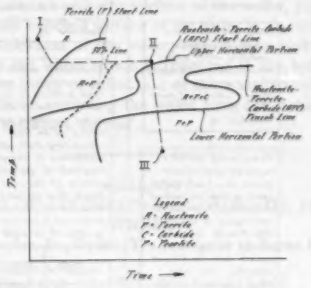
rapidly cooling the part, at a rate which avoids substantially any transformation during the cooling, to a second temperature range below the first temperature range, within which second temperature range the part may be held for a period of time to substantially transform the remaining austenite to ferrite and pearlite without any other type of substantial carbide formation, and

holding the part within the second temperature range for a period of time sufficient to effect the substantial transformation.

14. A method of preparing powder metal steel parts comprising about 0.3 to 0.5% Mo, less than about 0.45% C, less than about 0.9% Mn, balance essentrally iron which exhibit improved machinability, comprising the steps:

preparing a steel forming powder mixture,

compacting and sintering the mixture,



hot forming the sintered compact to a desired part shape, the hot forming temperature being high enough to insure the presence of a substantially austenitic structure in the part,

cooling the part to a first temperature range below the hot forming temperature, within which temperature range the part may be held for a period of time to partially transform the austenite to ferrite without forming any substantial amount of carbides,

holding the part within the first temperature range for a period of time sufficient to effect the partial transformation of the austenite, the remaining austenite becoming carbon enriched as a result thereof,

rapidly cooling the part, at a rate which avoids substantially any transformation during the cooling, to a second temperature range below the first temperature range, within which second temperature range the part may be held for a period of time to substantially transform the remaining austenite to ferrite and pearlite without any other type of substantial carbide formation, and

holding the part within the second temperature range for a period of time sufficient to effect the substantial transformation.

29. A method of producing steel parts comprising about 0.3 to 0.5% Mo, less than about 0.45% C, less than about 0.9% Mn, balance essentrally iron, comprising the steps:

providing a steel part,

heating the part to an austenitizing temperature,

cooling the part to a first temperature range below the

austenitizing temperature and above the upper horizontal portion of the austenite-ferrite-carbide start line on a time-temperature-transformation graph for the particular steel composition of the part and of the general type shown in the drawing Figure,

maintaining the part within that temperature range for a period of time short of the AFC start line and sufficient to partially transform some of the austenite to ferrite without any accompanying substantial formation of carbides,

rapidly cooling the part to a second temperature range below the first temperature range and below the lower horizontal portion of the AFC finish line on the time-temperature-transformation graph for the alloy, and

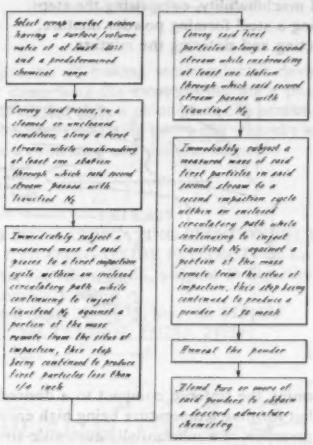
maintaining the part within that temperature range for a period of time sufficient to substantially transform any remaining austenite to a mixture consisting essentially of ferrite and pearlite.

4,018,633

CRYOGENIC METAL CHIP RECLAMATION

Maxwell S. Holland, Troy, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 19, 1975, Ser. No. 633,519
Int. Cl.² B22F *1/00*
U.S. Cl. 148—126 **18 Claims**


Select scrap metal pieces having a surface/volume ratio of at least 60:1 and a predetermined chemical range
Convey said pieces, in a cleaned or uncleaned condition, along a first stream while enshrouding at least one station through which said second stream passes with liquified N_2
Immediately subject a measured mass of said pieces to a first impaction cycle within an enclosed circulatory path while continuing to inject liquified N_2 against a portion of the mass remote from the sites of impaction, this step being continued to produce first particles less than 1/8 inch
Convey said first particles along a second stream while enshrouding at least one station through which said second stream passes with liquified N_2
Immediately subject a measured mass of said first particles in said second stream to a second impaction cycle within an enclosed circulatory path while continuing to inject liquified N_2 against a portion of the mass remote from the sites of impaction, this step being continued to produce a powder of 30 mesh
Anneal the powder
Blend two or more of said powders to obtain a desired admixture chemistry

1. A method of making a metal powder suitable for use as a sinterable powder, the method comprising:

a. selecting and conveying a charge of metal pieces along a continuous stream, said pieces having a transverse dimension no greater than ½ inch,

b. injecting and directing a liquified cryogenic cooling medium, said medium being normally gaseous at ambient temperature conditions, against at least one section of said stream in sufficient amount to reduce the temperature of all the scrap pieces passing through said section to a temperature below the ductile-brittle transition temperature of the metal pieces,

c. immediately conveying the super cooled metal pieces into a circulatory path and repetitively bringing a series of impacting elements against said super cooled pieces causing said pieces to fragment into particles and

d. during said impaction of step (c) injecting a liquid cryogenic cooling medium into said path to insure said pieces and fragmented particles remain below said ductile-brittle transition temperature during any number of circulations in said path.

7. A method of making a metal powder suitable for use as a sinterable powder, the method comprising:

a. selecting scrap metal pieces having a surface/volume ratio of at least 60:1 and a predetermined chemical range,

b. conveying said pieces, in a cleaned or uncleaned condition, along a first stream while shrouding at least one station through which said first stream passes with a liquid cryogenic medium,

c. conveying said cryogenically cooled pieces along a first circulatory path in a slurry formed with additional liquid cryogenic medium,

d. repeatedly impacting said pieces in said slurry with a sufficient force and frequency to fragment and comminute said pieces into a supply of particles having a first predetermined size,

e. separating said supply of particles from said slurry and thence conveying said supply of particles along a second stream while shrouding at least one station through which said second stream passes with a liquid cryogenic medium,

f. conveying said second stream particles along the second circulatory path in the form of a slurry provided by additional introduction of liquid cryogenic medium, and

g. repeatedly impacting said pieces in said second circulatory slurry with sufficient force and frequency to fragment and comminute said pieces into a powder supply having a second predetermined size no greater than 10% of said first predetermined size, said second predetermined size being achieved by at least 90% of the pieces exiting from said second circulatory slurry.

16. A method of producing powder metal, comprising:

a. selecting a charge of metal scrap pieces each carrying machining oil resulting from cutting operations and conveying said scrap pieces along a stream,

b. injecting a liquified cooling medium against a section of said stream so as to contact the pieces at a substantial number of points whereby substantially all of the scrap pieces will be reduced in temperature below their ductile-brittle transition temperature,

c. immediately conveying the super cooled scrap pieces into a circulatory path within a chamber and wherein a series of impacting elements are repetitively brought against said scrap metal pieces and frozen oil to produce a composite homogeneous mixture of metal powder particles and fragmented frozen oil particles, during said impacting step a liquid cryogenic cooling medium is injected against said scrap pieces at a point of said circulatory path remote from said impacting elements to insure that the metal scrap and frozen oil retain their super cooled condition throughout repetitive impacting, and

d. permitting said composite mixture to be elevated to ambient temperature conditions whereby each comminuted frozen oil particle forms a liquid coating along each of the several adjacent metal particles.

4,018,634

METHOD OF PRODUCING HIGH STRENGTH STEEL PIPE

Vernon Fencl, Northbrook, Ill., assignor to Grotnes Machine Works, Inc., Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 642,722
Int. Cl.² C21D *1/78*; B21B *3/00*; B23K *31/06*
U.S. Cl. 148—131 **9 Claims**

1. A method of treating steel pipe made by forming and welding a mother plate, said method comprising the steps of

shrinking the pipe in the radial direction by applying compressive radial pressure to the outside surface of the pipe to reduce the pipe diameter by at least about 1.5% and thereby increase the circumferential compressive yield strength of the pipe,

and then heating the pipe to a temperature below the transformation temperature of the steel but high enough to increase the circumferential tensile yield strength of the pipeabove the tensile yield strength of the mother plate.

4,018,635

PHOSPHOR COMBINATION, PARTICULARLY ADAPTED FOR USE WITH EXPLOSIVES, FOR PROVIDING A DISTINCTIVE INFORMATION LABEL

Frederick M. Ryan, New Alexandria, and Robert C. Miller, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 143,772, May 17, 1971, Pat. No. 3,772,099. This application Mar. 27, 1973, Ser. No. 345,375

Int. Cl.² C06B *45/00, 45/02, 39/00;* C09K *3/00*

U.S. Cl. 149—2 9 Claims

1. In combination, conglomerated small particles useful for providing an individualistic and readily identifiable indicia, said combination comprising:

a. finely divided inorganic phosphor material which is excited by predetermined energy in order to produce readily detectable radiations;

b. at least one finely divided stable other material which provides an individualistic characteristic that is readily identified once said other material has been located; and

c. inorganic binder material intimately holding together said phosphor material and said other material as a plurality of small particles each comprising conglomerates of said finely divided phosphor material and said finely divided other material.

4,018,636

SOLUBLE BINDER FOR PLASTIC BONDED EXPLOSIVES AND PROPELLANTS

Paul L. O'Neill, China Lake, Calif., and Juan L. Hooper, Glenelg North, Australia, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 20, 1976, Ser. No. 678,572

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.4 6 Claims

1. An explosive composition consisting essentially of an explosive filler selected from the group consisting of cyclotrimethylenetrinitramine, cyclotetramethylenetetranitramine and pentaerythritol tetranitrate and a binder selected from the group consisting of an isocyanate cured mixture of (1) polyglycol adipate and the polyethylene oxide/propylene oxide glycol adduct of trimethylolpropane, (2) polyethylene glycol and trimethylolpropane, (3) polyethylene glycol and the ethylene oxide capped polypropylene glycol adduct of trimethylolpropane, and (4) ethylene oxide capped polypropylene glycol and the ethylene oxide capped polypropylene glycol adduct of trimethylolpropane.

4,018,637

NITROCELLULOSE LACQUER WITH SURFACTANT

Earl J. Kimmel, Tallahassee, Fla., and Charles Earnest Silk, deceased, late of Alton, Ill. (by Wilma F. Silk, sole heir), assignors to Olin Corporation, New Haven, Conn.

Filed Feb. 20, 1975, Ser. No. 551,441

Int. Cl.² C06B *25/18, 25/20;* C09K *3/00;* C08B *5/04*

U.S. Cl. 149—96 9 Claims

1. A process for forming a flowable lacquer comprising the steps of:

a. providing a supply of a major amount of nitrocellulose and a minor amount of water;

b. adding to said supply an amount of solvent sufficient to dissolve said nitrocellulose, said solvent being immiscible with said water; and

c. adding to said supply an amount of an emulsion inhibitor sufficient to prevent said water from forming discrete globules in the mixture of solvent and dissolved nitrocellulose.

4,018,638

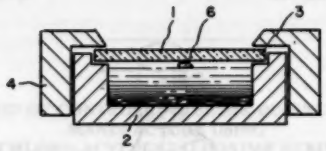
METHOD OF REDUCING THE THICKNESS OF A WAFER OF FRAGILE MATERIAL

Barry M. Singer, New York, and Joseph J. Lalak, Briarcliff Manor, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,967

Int. Cl.² C23F *1/02*

U.S. Cl. 156—626 4 Claims



1. A method for reducing the thickness of a wafer of fragile material comprising the steps of placing the wafer supported at its rim in a holder filled with a non-corrosive liquid having a bubble in contact with one surface of the wafer, placing the holder with the exposed surface of the wafer in an etch bath to reduce the thickness of the wafer, transmitting visible radiation through the wafer which is reflected at the bubble and measuring the index of refraction of the wafer to said visible radiation without removing the wafer from the holder to determine the thickness thereof.

4,018,639

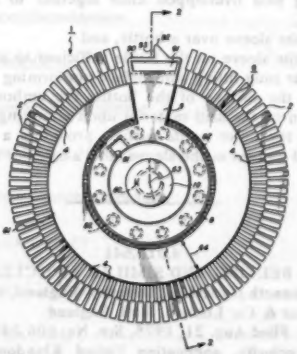
METHOD OF ASSEMBLING A COMPOSITE PRINT WHEEL

Ernest L. Staples, Jr., Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 15, 1975, Ser. No. 622,565

Int. Cl.² B32S *3/20*

U.S. Cl. 156—73.1 6 Claims



1. A method of assembling a composite print wheel comprising the steps of:

locating a hub member in an assembly fixture in a fixed predetermined position,

locating an insert member, with character slugs attached to outer ends of beams, in the assembly fixture in a fixed predetermined position such that print characters on the character slugs align with and fit into a respective molded

likeness of a corresponding print character provided in the assembly fixture; and

fastening the hub member and the insert member together.

4,018,640

DECORATIVE NECKBAND LABEL FOR A BOTTLE

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 632,333, Nov. 17, 1975, Pat. No. 3,984,005, which is a continuation-in-part of Ser. No. 514,370, Oct. 15, 1974, Pat. No. 3,951,292. This application May 14, 1976, Ser. No. 686,624

Int. Cl.² B24C *27/20*

U.S. Cl. 156—86 **10 Claims**

1. The method of decoratively labelling a bottle comprising making line impressions in the surface of a sheet of cellular, organic polymeric material that is highly oriented along one dimension, by compressing the material along said line and normal to the plane of the sheet, the line impressions providing embossed patterns in the sheet in which said line impressions extend angularly with respect to said highly oriented dimension,

forming a sleeve from the sheet by overlapping the opposite ends thereof which are spaced apart in the direction of said highly oriented dimension, said dimension lying in the circumference of said sleeve, and the compressed line pattern therein being disposed in the interior surface of the sleeve,

fastening said overlapped ends together to secure said sleeve,

placing the sleeve over a bottle, and

heating the sleeve on the bottle sufficient to shrink it into annular snug fitting and surface conforming relationship about the surface of the bottle, the embossed pattern portion of the said material upon shrinking said sleeve about the outer bottle surface providing a raised, embossed pattern in the sleeve label's exterior surface.

4,018,641

BELTING AND SIMILAR ARTICLES

William Kenneth Donaldson, Beverley, England, assignor to J. H. Fenner & Co. Limited, Hull, England

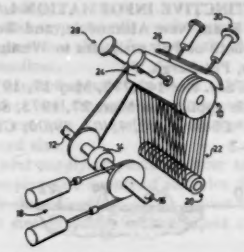
Filed Aug. 21, 1975, Ser. No. 606,349

Claims priority, application United Kingdom, Aug. 21, 1974, 36695/74

Int. Cl.² B29H *7/22*

U.S. Cl. 156—137 **10 Claims**

1. A method of treating by selectively heating and cooling articles in the form of conveyor and power transmission belts and the like during manufacture, said method comprising the steps of presenting limited regions of the article successively to a treatment zone of preselected length wherein the articles are subjected to pressure accompanied by simultaneous heat transfer, displacing the article through said zone between applications of pressure and heat transfer with the extent of



article displacement being short compared to the length of said zone.

4,018,642

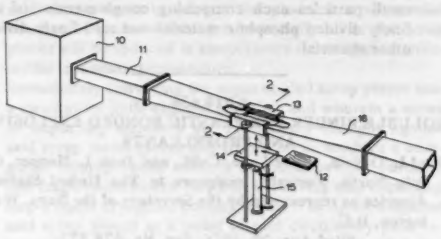
MICROWAVE CURING OF ALKALINE PHENOLIC RESINS IN WOOD-RESIN COMPOSITIONS

Robert L. Pike, and Derek Barnes, both of Vancouver, Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada

Filed Sept. 8, 1975, Ser. No. 610,923

Int. Cl.² B29C *19/02*

U.S. Cl. 156—272 **12 Claims**



1. A method for making a composite product from a composition comprising wood and a binder for said wood, said binder comprising an alkaline phenolic resin whose rate of cure is accelerated by the application of heat, said method comprising locating said composition in juxtaposition with respect to a waveguide such that microwaves propagating through said waveguide in the form of a travelling wave will propagate through said composition, propagating a microwave having a frequency of at least 100 MHz through said waveguide and said composition to heat said resin and accelerate its curing, and applying pressure to said composition before said resin has cured.

4,018,643

METHOD OF FORMING A PACKET OF SEPARATED MICROSCOPE SLIDES

Marshall S. Levine, Wayne, Pa., assignor to Geometric Data Corporation, Wayne, Pa.

Filed May 19, 1976, Ser. No. 688,005

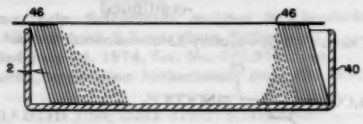
Int. Cl.² B32B *31/00*; B65B *15/00*

U.S. Cl. 156—297 **1 Claim**

1. The method of forming a packet of separated microscope slides comprising:

tilting a plurality of microscope slides which are in registration with adjacent slides in contact and parallel to each other to place one edge of each slide substantially in a common plane outside of a substantially parallel plane containing the adjacent parallel edge of the slide while retaining adjacent slides in contact,

securing a length of tape to the edges of the slides in said common plane, and



straightening the slides to separate each slide from its adjacent slides.

4,018,644

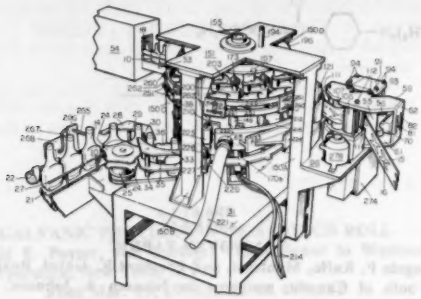
APPARATUS FOR PRODUCING SHRUNKEN PILFER-PROOF NECK LABELS FOR CONTAINERS

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 526,124, Nov. 22, 1974. This application June 2, 1976, Ser. No. 692,067

Int. Cl.² B29D *23/10;* **B29C** *17/00, 27/00*

U.S. Cl. 156—446 **2 Claims**



1. A mandrel turret apparatus comprising

a frame,

a central shaft rotatably supported by said frame,

drive means connected to said shaft for rotating said shaft,

an annular hub connected to said shaft for rotation therewith,

a rotary manifold distributor connected to said hub for rotation therewith, a stationary manifold plate having an arcuate chamber thereon, opening toward the distributor,

plural mandrel assemblies connected on said hub in an annular array at equally spaced apart intervals, each mandrel assembly including

a rotatably mounted shaft disposed substantially parallel with said central shaft and having an axial passage,

a cylindrical mandrel sleeve fastened on one end of the shaft, the sleeve having plural apertures on the periphery thereof and encircling said passage,

passage means connecting the axial passage of the shaft and plural apertures of said sleeve,

means connecting the axial passage of the shaft remote from the sleeve apertures to the distributor and including a manifold port on the distributor facing the manifold plate and connected to said arcuate chamber during a portion of each revolution of the central shaft,

rotary drive means connected to the mandrel shaft for rotating it at least one revolution during each revolution of the central shaft,

a sleeve stripper contoured for sliding movement along the mandrel sleeve,

a crank pivotally connected on the hub and connected to said stripper for sliding it along the mandrel,

a cam follower on said crank,

a circular cam encircling the central shaft and guiding the follower for moving the strippers cyclically between retracted and stripping positions along their mandrel sleeves,

a blank loading station adjacent the mandrel path,

means feeding label blanks of flexible sheet-like material at said station for management by a mandrel,

a label blank guide member mounted on the frame adjacent said loading station and extending parallel with the rotary path of said mandrel sleevs for guiding the free portion of blanks during movement past said guide,

a source of heat,

heat applying means individual to the mandrels for applying heat to the blanks wound on the mandrels, and

means for connecting the source of heat to the individual heat applying means in response to movement of each of the mandrels along the guide member for heat sealing the ends of the blanks on the mandrels to form a sleeve thereon.

4,018,645

METHOD OF CONTROLLING SLIME DURING PAPER MANUFACTURE USING ALPHA-CHLORO-ACYLBENZALDOXIME DERIVATIVES

Nobuyasu Takahashi, Koshigaya; Taiichi Yamaguchi, Kasubabe; Junei Sakaguchi, Kawasaki, and Hideo Hamada, Soka, all of Japan, assignors to Somar Manufacturing Co., Ltd., Tokyo, Japan

Division of Ser. No. 341,651, March 15, 1973, abandoned. This application Apr. 24, 1975, Ser. No. 571,818

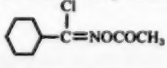
Claims priority, application Japan, Mar. 16, 1972, 47-26748

Int. Cl.³ D21D *3/00;* **D21H** *5/22*

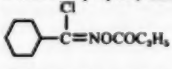
U.S. Cl. 162—76 **4 Claims**

1. A method for controlling slime in a paper or pulp manufacturing process stream comprising adding to said stream a composition comprising at least α-chloro-acylbenzaldoxime derivative an organic solvent selected from the group consisting of diethylene glycol monomethyl ether, trimethyl benzene, dimethylformamide and xylene in an effective slime controlling amount to maintain a concentration of at least about 2.5 ppm in the process stream of said at least one α-chloro-acylbenzaldoxime derivative which is selected from the group consisting of

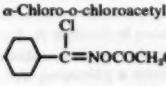
α-Chloro-o-acetylbenzaldoxime



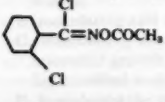
α-Chloro-o-propionylbenzaldoxime



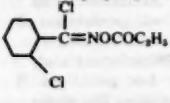
α-Chloro-o-chloroacetylbenzaldoxime



α-Chloro-o-acetyl-2-chlorobenzaldoxime



α-Chloro-o-propionyl-2-chlorobenzaldoxime



α-Chloro-o-chloroacetyl-2-chlorobenzaldoxime

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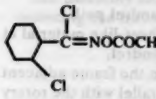
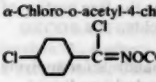
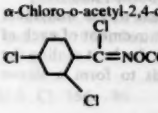


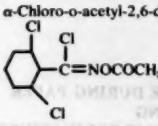
α-Chloro-o-acetyl-4-chlorobenzaldoxime



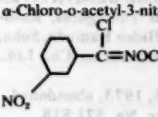
α-Chloro-o-acetyl-2,4-dichlorobenzaldoxime



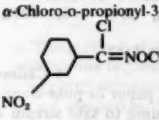
α-Chloro-o-acetyl-2,6-dichlorobenzaldoxime



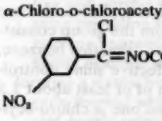
α-Chloro-o-acetyl-3-nitrobenzaldoxime



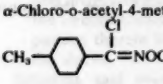
α-Chloro-o-propionyl-3-nitrobenzaldoxime



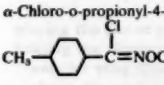
α-Chloro-o-chloroacetyl-3-nitrobenzaldoxime



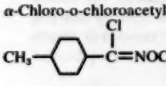
α-Chloro-o-acetyl-4-methylbenzaldoxime



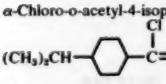
α-Chloro-o-propionyl-4-methylbenzaldoxime



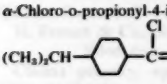
α-Chloro-o-chloroacetyl-4-methylbenzaldoxime



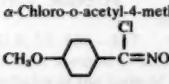
α-Chloro-o-acetyl-4-isopropylbenzaldoxime



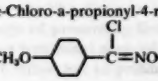
α-Chloro-o-propionyl-4-isopropylbenzaldoxime



α-Chloro-o-acetyl-4-methoxybenzaldoxime



α-Chloro-a-propionyl-4-methoxybenzoldoxine



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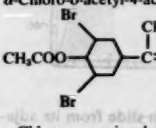
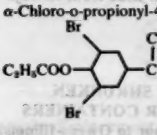
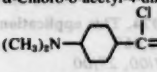
α-Chloro-o-acetyl-4-acetoxy-3,5-dibromobenzaldoxime



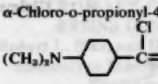
α-Chloro-o-propionyl-4-propionyloxy-3,5-dibromobenzaldoxime



α-Chloro-o-acetyl-4-dimethylaminobenzaldoxime



α-Chloro-o-propionyl-4-dimethylaminobenzaldoxime



4,018,646

NONWOVEN FABRIC

Angelo P. Ruffo, Montreal, and Prashant K. Goyal, Roxboro, both of Canada, assignors to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 358,783, May 9, 1973, abandoned, which is a division of Ser. No. 108,546, Jan. 21, 1971, Pat. No. 3,768,118. This application Oct. 29, 1975, Ser. No. 626,883

Int. Cl.[2] D21H *5/26*

U.S. Cl. 162—146 **4 Claims**

1. An air-laid nonwoven web having a thickness from about 1/32 inch to about 1 inch and having a pair of opposed major faces, comprised at one of said faces of a blend of a major proportion by weight of a staple length fiber having a length from about ½ inch to about 2½ inches as a first fiber type and a minor proportion by weight of short cellulose fibers having a length less than about one-fourth inch as a second fiber type interspersed therewith, and comprises at said other face of a blend of a major proportion by weight of said second fiber type and a minor proportion by weight of said first fiber type interspersed therewith, the web between said faces being comprised of a blend of fibers exhibiting a continuous uniform transition in which the proportion of said first fiber in the blend becomes progressively and continuously less with distance from said one face while the proportion of said second fiber in the blend becomes progressively and continuously less with distance from said other face, each of said fiber types being present in an amount of at least 5% at each major face.

4,018,647

PROCESS FOR THE IMPREGNATION OF A WET FIBER WEB WITH A HEAT SENSITIZED FOAMED LATEX BINDER

Popke Wietsma, Velp, Netherlands, assignor to Chemische Industrie AKU-Goodrick B.V., Arnhem, Netherlands

Filed June 10, 1974, Ser. No. 477,910

Claims priority, application Netherlands, June 18, 1973, 7308406

Int. Cl.² D21D *3/00*; D21F *11/02*; D21H *3/40*

U.S. Cl. 162—168 R 3 Claims

1. In the process of manufacturing a fiber web made by the wet method on a paper machine impregnated with a latex binder composition while passing through a screening area of a paper making type machine, the improvement which comprises

applying a foamed latex binder composition heat-sensitized to coagulate in the temperature range of from 35° to 95° C as a layer on the top surface of said web,

drawing said layer of foamed composition into said web by means of suction,

and drying the resulting web and its content of foamed binder composition to coagulate said formed binder composition.

4,018,648

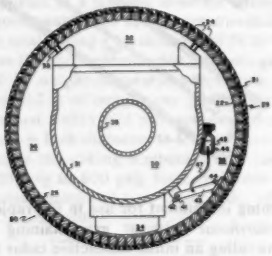
GALVANIC PROTECTION OF A COUCH ROLL

Harold E. Poyser, Hot Springs, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,181

Int. Cl.² D21F *3/10*

U.S. Cl. 162—199 8 Claims



1. A papermachine couch roll comprising:

A. Perforated cylinder couch shell means having a metal interior cylindrical surface mounted for rotation about a cylindrical axis;

B. Stationary vacuum box means disposed internally of said shell means for sealing a partial vacuum applied to an arcuate portion of said interior cylindrical surface of said shell means;

C. Electrically conductive brush means secured to said vacuum box means by electrically non-conductive mounting means, said brush means being disposed for maintaining electrical contact with said interior surface during rotation of said shell means; and,

D. Sacrificial anode means comprising a more noble metal in the electromotive series than the interior surface metal of said shell means, said anode means being electrically connected with said brush means.

4,018,649

PROCESS FOR CONTROL OF CELL DIVISION

Clarence D. Cone, Jr., 104 Harbour Drive, Yorktown, Va. 23490

Continuation of Ser. No. 314,656, Dec. 13, 1972, abandoned, which is a continuation of Ser. No. 125,235, March 17, 1971, abandoned. This application Oct. 17, 1975, Ser. No. 623,238

Int. Cl.² C12K *9/00*

U.S. Cl. 195—1.8 10 Claims

1. A reversible process for controlling division of biological cells which consists essentially of

adjusting the effective cellular electrical transmembrane potential difference to a desired level between about −10mV and about −90mV by varying the relative intracellular concentrations of Na^+, K^+ and Cl^- ions,

maintaining the thus imposed transmembrane potential difference at a constant level for a time sufficient to permit the cell metabolism to stabilize at the imposed level of transmembrane potential difference, and

further maintaining the imposed transmembrane potential difference at a constant level for an additional time sufficient to achieve the desired cellular effect.

4,018,650

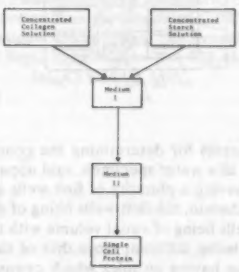
METHOD OF PRODUCTION AND RECOVERY OF PROTEIN FROM FOOD WASTES

Francis F. Busta, St. Paul; Bruce E. Schmidt, Golden Valley, and Larry L. McKay, St. Paul, all of Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed Oct. 1, 1975, Ser. No. 618,289

Int. Cl.² C12B *1/00*

U.S. Cl. 195—28 R 13 Claims



1. A method of producing and recovering protein from food wastes, which method comprises:

A. preparing a mixed liquid medium from a combination of protein-containing and carbohydrate-containing food wastes,

B. inoculating said medium with a species of Bacillus,

C. maintaining the medium under conditions favorable to microbial growth for a time sufficient to produce a Bacillus-modified enriched medium,

D. inoculating the resulting modified medium with a species of Lactobacillus,

E. maintaining the resulting medium under conditions favorable for microbial growth for a time sufficient to produce Lactobacillus in the enriched medium, and

F. extracting and recovering the resulting Lactobacillus single cell protein.

4,018,651

METHOD FOR REGENERATING GLUCOSE OXIDASE REAGENT

Elio D. Canto, 425 W. 205th St., New York, N.Y. 10034, and Albert H. Padovani, Orchard Hill Road, Katonah, N.Y. 10536

Filed Mar. 20, 1975, Ser. No. 560,231
Int. Cl.² G01N 31/14
U.S. Cl. 195—103.5 C 9 Claims

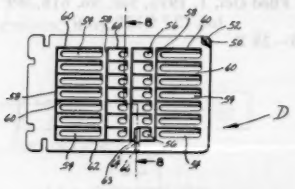
1. In a method for determining the concentration of glucose in a sample of biological fluid wherein the sample containing glucose is introduced into an aerated reagent comprising glucose oxidase, catalase, and ethanol; the glucose reacts with oxygen present in the aerated reagent; the rate of oxygen consumption is measured; the concentration of glucose is calculated, said concentration being proportional to the rate of oxygen consumption; and the waste liquid comprising the sample and used reagent is collected in a waste container, the improvement which comprises adding to said waste container prior to collection of waste liquid therein, a reagent activator comprising an amount of catalase sufficient to provide a concentration of at least 2 U/ml of added catalase in the total volume of waste liquid collected, aerating the thus treated waste liquid and using said treated aerated waste liquid as the reagent for additional determinations of glucose concentration according to said method.

4,018,652

PROCESS AND APPARATUS FOR ASCERTAINING THE CONCENTRATION OF MICROORGANISM IN A WATER SPECIMEN

James W. Lanham, St. Louis County; James T. Holen, Florissant, and Norman L. Fadler, St. Peters, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Jan. 9, 1976, Ser. No. 647,802
Int. Cl.² C12K 1/04
U.S. Cl. 195—103.5 M 7 Claims



1. An apparatus for determining the concentration of microorganisms in a water specimen, said apparatus comprising a rigid body having a plurality of first wells and a plurality of second wells therein, the first wells being of equal volume and the second wells being of equal volume with the volume of the second wells being different from that of the first wells, the rigid body also having an inlet which opens outwardly from the body and forms an entry into which the water specimen may be introduced into the body, the rigid body further having filling channels leading up to and opening into the first and second wells, there being a separate filling channel for each first well and for each second well with each filling channel communicating with the inlet such that a water specimen introduced into the inlet passes into the filling channels and then into the wells, the upstream end of each filling channel being in communication with the inlet independently of the other filling channels so that the water specimen will flow into each well without passing through another well; means closing the ends of the wells and the sides of the filling channels for isolating the interiors of the wells and filling channels from the surrounding atmosphere except through the inlet, said means being transparent; and a culture medium in the wells.

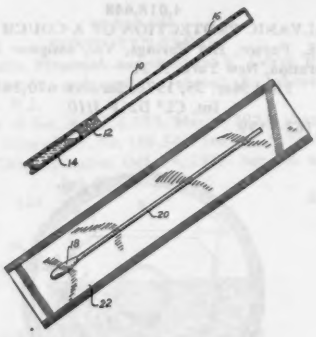
5. A process for ascertaining the concentration of microorganisms in a water specimen, said process comprising: placing thewater specimen in communication with filling channels leading to sealed first cavities which are of known and equal volume; placing the water specimen in communication with additional filling channels leading to sealed second cavities which are of known and equal volume, the volume of the second cavities being less than the volume of the first cavities; placing the water specimen under a vacuum so that air is evacuated from the first and second cavities and filling channels through the water specimen; releasing the vacuum and subjecting the water specimen to atmospheric pressure so that the water specimen is forced through the filling channels and into the first and second cavities to take the place of the evacuated air; mixing the water specimen with a nutrient medium such that a mixture of water specimen and nutrient medium exists in the first and second cavities; observing the water specimen in the first and second cavities for a change in the appearance thereof to determine the number of cavities which change appearance, and comparing the number of cavities which do change appearance with tabulated results derived from statistical evaluations to determine the concentration of microorganisms.

4,018,653

INSTRUMENT FOR THE DETECTION OF *NEISSERIA GONORRHOEAE* WITHOUT CULTURE

Frederick C. Mennen, La Porte, Ind., assignor to U.S. Packaging Corporation, La Porte, Ind.

Division of Ser. No. 193,739, Oct. 29, 1971, Pat. No. 3,876,503. This application Dec. 30, 1974, Ser. No. 537,593
The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.
Int. Cl.² C12K 1/10
U.S. Cl. 195—127 4 Claims



1. A swabbing instrument for use in the rapid detection of *Neisseria gonorrhoeae* without gram-staining and without culture by providing an initial distinctive color change on the swab of the instrument after collecting an inoculum on the swab, said instrument consisting essentially of:

a stick for the swab used to collect the inoculum;

a sterile swab mounted on said stick for obtaining a clinical specimen of said Neisseria from the penis as an exudate and the only inoculum of bacteria at the collection site from the patient;

a tube of transparent plastic having flexible side walls and a closed end into which the swab and inoculum are inserted by the stick;

A dry substantially colorless pledget disposed in said tube which is impregnated with a dilute colorless solution of N, N, N′ N′ tetramethyl-p-phenylenediamine dihydrochloride in alcohol which has been dried;

a frangible ampul containing a wetting activating agent for said tetramethyl-p-phenylenediamine compound in said tube;

said dry pledget placed above said ampul and reacting when

wetted after breaking of said ampul to wet said swab without coloration but to react with *Neisseria gonorrhoeae* in the inoculum on said swab to produce a distinctive initial color change;

said wetting activating agent constituting the sole liquid agent to activate said dry pledget and said agent being selected from the group consisting of water, physiological saline, and aqueous buffer solutions at pH 6.5 to 7.2; and,

said initial distinctive color change being a purple shade produced on the inoculum on said swab at the site of collection of the bacteria, after said clinical specimen of exudate is taken from the patient and the swab is placed on the wetted pledget, wetted with said activating agent, and within two minutes to be directly indicative of *Neisseria gonorrhoeae* bacteria in said specimen.

4,018,654

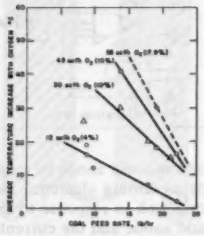
PRETREATMENT OF COAL DURING TRANSPORT

Glenn E. Johnson, Pittsburgh; Harry B. Nellson, Clairton; Albert J. Forney, Coraopolis, and William P. Haynes, Pittsburgh, all of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 5, 1974, Ser. No. 503,537

Int. Cl.² C10B *57/08;* **C10L** *9/00*

U.S. Cl. 201—9 **1 Claim**



1. In a process for decaking a caking coal including a pretreatment step to reduce its agglomerating properties while it is being transported to a treating zone for subsequent treatment the improvement within said pretreatment step comprising passing the coal having a particle size of 50 to 250 microns at a rate of 5 to 100 lb/hr entrained in nitrogen gas in mixture with 4 to 15% by weight oxygen at a flow rate sufficient to provide at least 0.2 ft of oxygen per pound of coal, heating said cool entrained within said nitrogen-oxygen mixture in a passage of about ½ inch diameter to a temperature of 300° to 425° C but below the caking temperature of said coal, at a pressure of 100 psig to 600 psig for a residence time of the coal in the heated passage of 1 to 15 seconds; whereby a FSI of 2 or below is achieved.

4,018,655

PROCESS FOR FEEDING COAL INTO HORIZONTAL-CHAMBER COKE-OVENS AND CHARGING TRUCK THEREFOR

Horst Fach, Essen, Germany, assignor to Didier Engineering GmbH, Essen, Germany

Filed July 3, 1975, Ser. No. 593,045

Claims priority, application Germany, July 11, 1974, 2433346

Int. Cl.² C10B *57/00*

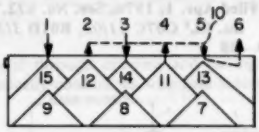
U.S. Cl. 201—40 **5 Claims**

1. A process for feeding coal into horizontal-chamber coke-ovens of the type including a plurality of first filling openings and a plurality of second filling openings each positioned between adjacent of said first filling openings, said filling openings being substantially equally spaced and being arranged side by side in each coke-oven chamber, said process comprising:

first feeding through one of said first filling openings positioned adjacent to a riser leading from said oven chamber a partial portion of the total amount of coal to be introduced into said oven chamber through said one first filling opening, said first feeding through said one first filling opening being completed when the outer edge of the base of a resultant cone-shaped charge is situated approximately below one of said second filling openings adjacent said one first filling opening;

thereafter feeding through the remainder of said first filling openings partial portions of the respective total amounts of coal to be introduced into said oven chamber through said remainder of said first filling openings;

said partial portions being introduced through said first



filling openings until the bases of the resultant cone-shaped charges thus formed approximately contact each other;

thereafter feeding through each of said second filling openings partial portions of the respective total amounts of coal to be introduced into said oven chamber through said second filling openings, said step of feeding through said second filling openings being completed a short time before the coal would run over said cone-shaped charges formed during said steps of feeding through said first filling openings; and

subsequently alternately repeating feeding of coal through said one first filling opening, said remainder of said first filling openings and said second filling openings until said oven chamber is filled.

4,018,656

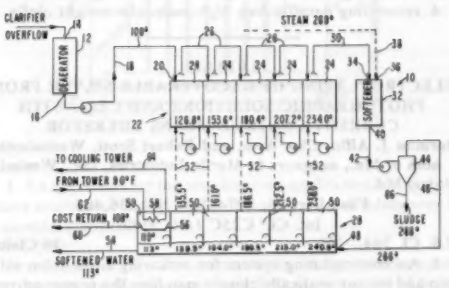
THERMAL SOFTENING AND DISTILLATION BY REGENERATIVE METHOD

Alfred N. Rogers, Pleasanton; Leon Awerbuch, San Francisco, and Jack Z. Abrams, San Rafael, all of Calif., assignors to Bechtel International Corporation, San Francisco, Calif.

Filed Sept. 3, 1974, Ser. No. 502,465

Int. Cl.² B01D *3/06*

U.S. Cl. 203—11 **21 Claims**



1. A method of treating water having dissolved impurities therein with at least certain of the impurities having solubilities which vary inversely with temperature comprising: directing a continuous flow of impure water along a first path; preheating said impure water as it flows along said first path; urging said preheated water through a region at which said water is heated to a temperature sufficient to cause at least some of said certain impurities therein to be precipitated; separating the precipitated impurities from said water to

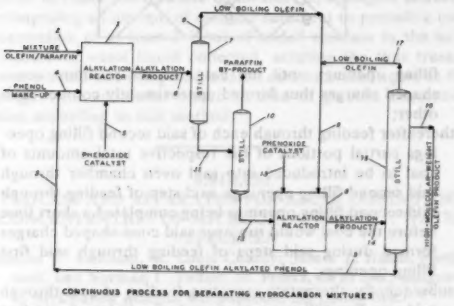
thereby purify the latter; directing the purified water along a second path; and reducing the pressure of said purified water as it flows along said second path to cause a portion of said purified water to flash into a vapor, said preheating step including directing said vapor into said first path and into direct, admixing contact with said impure water flowing therethrough to heat the latter.

4,018,657

SEPARATION OF HYDROCARBON MIXTURES BY ALKYL DISPLACEMENT

William A. Sweeney, Larkspur, and Milutin Simic, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Apr. 1, 1976, Ser. No. 672,704
Int. Cl.² C07C *11/02*; B01D *3/34*
U.S. Cl. 203—38 **6 Claims**



CONTINUOUS PROCESS FOR SEPARATING HYDROCARBON MIXTURES

1. A process for separating a close-boiling mixture comprising high-molecular-weight olefins and paraffins which comprises the steps of:

1. contacting a paraffin-dilute high-molecular-weight olefin mixture with a phenolic compound in the presence of a phenoxide alkylation catalyst under conditions effective to cause olefin alkylation between the high-molecular-weight olefin and the phenol to prepare a high-molecular-weight alkyl phenol;
2. recovering the high-molecular-weight alkyl phenols;
3. contacting the high-molecular-weight alkyl phenol with an excess of low-molecular-weight olefin in the presence of a phenoxide alkylation catalyst under conditions effective to regenerate the high-molecular-weight olefin; and
4. recovering paraffin-free high-molecular-weight olefin.

4,018,658

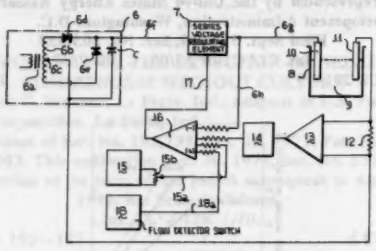
ELECTROPLATING OF RECOVERABLE SILVER FROM PHOTOGRAPHIC SOLUTIONS AND CELL WITH CURRENT CONTROL MEANS THEREFOR

Norman J. Alfin, Glen Arm, and Robert Scott, Westminster, both of Md., assignors to Merlin Industries, Inc., Westminster, Md.

Filed Dec. 26, 1974, Ser. No. 536,463
Int. Cl.² C25C *1/20*, *7/00*
U.S. Cl. 204—109 **20 Claims**

1. An electroplating system for removing silver from solution and for automatically closely matching the proper current density with changing silver concentrations in order to maximize silver conversion efficiency, which comprises a plating tank for said solution wherein said plating tank includes a cathode upon which said silver is to be plated and an anode, a control voltage regulatable source of DC voltage connected between said anode and said cathode, means for measuring the voltage across said cathode and said anode, and means for measuring the current flowing through said solution directly between said cathode and said anode to thereby sense the change in conductivity or resistance of the solution, said anode and said cathode act as sensing elements for measuring said voltage and said current, and analog circuit means responsive to the voltage across said anode and said cathode and the current flowing through said solution and thereby responsive to the resistance or conductivity of said solution for regulating said voltage in a predetermined voltage versus current characteristic to thereby automatically closely match the proper current density with changing silver concentration and the change of interface between the cathode and the solution in order to maximize silver conversion efficiency and minimize production of silver sulfide and production of hydrogen sulfide.

11. An electroplating process for removing silver from solution and for automatically closely matching the proper current density with changing silver concentrations in order to maximize silver conversion efficiency which comprises, introducing said solution into a plating tank which includes a cathode upon which said silver is to be plated and an anode; measuring the voltage across said cathode and said anode and measuring the current flowing through said solution directly



between said cathode and said anode by employing said cathode and said anode as sensing elements; and regulating the voltage to the plating tank in response to the voltage across said cathode and said anode and the current flowing through the solution directly between said cathode and said anode to thereby automatically closely match the proper current density with changing silver concentration in order to maximize silver conversion efficiency and at least minimize precipitation of silver sulfide and production of hydrogen sulfide.

15. A plating tank comprising a hollow cylindrical cathode being flexible and open ended and being removable from said tank and which can be flexed manually; a hollow cylindrical anode located internally of said hollow cylindrical cathode, a rotatable magnetic drive including a first magnet located interiorly of said anode, a motor coupled to rotate said first magnet and located interiorly of said anode, a second rotatable magnet located above said cylindrical anode in solely magnetically coupled relation to said first magnet, and stirring means mechanically coupled to said second magnet and extending into said tank between said anode and said cathode.

4,018,659

METHOD FOR RADIATION POLYMERIZATION AND COPOLYMERIZATION OF ISOBUTYLENE BY A CATIONIC MECHANISM

Miroslav Marek; Ludek Toman, and Jan Pecka, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Division of Ser. No. 275,157, July 26, 1972, Pat. No. 3,897,322. This application Apr. 3, 1975, Ser. No. 564,602
Claims priority, application Czechoslovakia, July 29, 1971, 5555/71
Int. Cl.² C08D *1/00*; C08F *1/16*
U.S. Cl. 204—159.24 **10 Claims**

1. A method for the polymerization of isobutylene, which comprises subjecting to a source of light selected from the group consisting of ultraviolet light, visible light, and infrared light at a temperature between about 0° C. and about −140° C.

an isobutylene feed selected from the group consisting of (a) essentially isobutylene and (b) essentially a mixture of isobutylene and butadiene and/or isoprene in the presence of at least one halide catalyst selected from the group consisting of tetravalent vanadium, titanium and zirconium halides and in the presence of at least one activator for said halide catalyst selected from the group consisting of magnesium aluminate, magnesium carbonate, and magnesium silicate, the molar ratio of said halide catalyst to said activator ranging from 10^3 to 10^3 part of halide catalyst to 1 part of activator.

4,018,660
GAS ELECTRODE

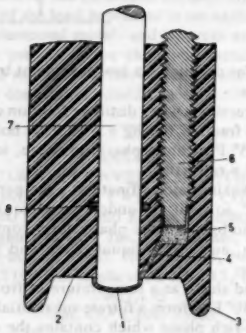
Elo Harald Hansen, Lyngby, and Jaromir Ruzicka, Naerum, both of Denmark, assignors to Zellweger Uster AG, Uster, Switzerland

Filed June 20, 1974, Ser. No. 481,047

Claims priority, application Denmark, July 5, 1973, 3757/73

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 R **13 Claims**



1. An electrochemical cell for measuring the gas content in a sample solution by pH measurement without immersing said electrochemical cell in said sample solution, said electrochemical cell comprising an ion-sensitive electrode and a reference electrode, an electrolyte solution for placing said ion-sensitive electrode and reference electrode in electrochemical contact with one another, said electrolyte forming a continuous, stabilized, stationary thin-film covering at least a portion of the surface of said ion-sensitive electrode, said electrolyte solution being retained in a chamber, said chamber communicating with said stationary thin-film through the agency of a porous plug, said thin-film of electrolyte solution covering said surface portion of the ion-sensitive electrode having an exposed surface which is adapted to be in direct physical contact with the gas evolved from said sample solution.

4,018,661
INSTRUMENT SENSOR ASSEMBLY

Gordon R. Brushwyler, Anaheim, and Timothy F. Scott, Brea, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 4, 1975, Ser. No. 610,278

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 F **11 Claims**

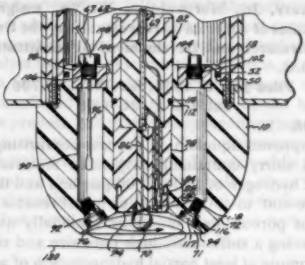
1. An instrument probe assembly comprising:

a. a probe member housing having a closed end for immersion in a liquid;

b. an open-ended concave recession in the closed lower end of said housing having a centrally recessed portion with an annular sidewall thereabout, inclined to the longitudinal axis of said housing;

c. at least one through opening in the sidewall of said concave recession; and

d. a probe member mounted for exposure to said liquid



seated in said through opening and having an exposed surface generally continuous with said sidewall.

4,018,662
METHOD AND APPARATUS FOR SIMULTANEOUS QUANTITATIVE ANALYSIS OF SEVERAL CONSTITUENTS IN A SAMPLE

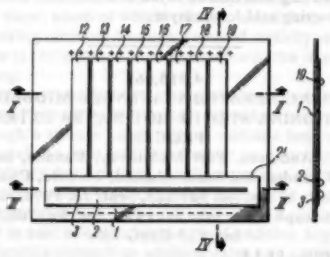
Gerhard Ruhenstroth-Bauer, Grafelfing, and Reiner Scherer, Munich, both of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Jan. 2, 1976, Ser. No. 646,391

Claims priority, application Germany, Jan. 3, 1975, 2500218

Int. Cl.² G01N *27/00, 27/26*

U.S. Cl. 204—299 R **8 Claims**



1. An apparatus for the simultaneous qualitative and quantitative analysis of a plurality of immuno-reactive substances in a sample, comprising:

i. a base;

ii. a first layer of a first carrier material deposited on said base to a defined extent, said first carrier material being free from antibodies capable of reacting with any substance in said sample; and including a depression for receiving said sample;

iii. a plurality of second layers of a second carrier material, deposited on said base to a defined extent adjacent the extent of said first layer, each of said plurality of second layers including a different ingredient capable of undergoing a precipitate-forming immunoreaction with a specific one of a plurality of substances to be analyzed in said sample.

4,018,663
COAL LIQUEFACTION PROCESS

Clarence Karr, Jr., Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 5, 1976, Ser. No. 646,706
Int. Cl.² C10G *1/08*
U.S. Cl. 208—10 **6 Claims**

1. An improved liquefaction process comprising passing a liquid coal slurry containing suspended materials under a pressure of hydrogen of 1000–2000 psig and at a temperature in the range 400° to 450° C. through a first reactor containing a charge of porous inert inorganic nominally non-catalytic material having a sufficiently high pore size and surface area so as to promote at least partial hydrogenation of asphaltenes, passing the partially hydrogenated hydrogen-pressurized slurry to a second reactor to contact a charge of hydrogenation catalyst at a temperature in the range 350° to 400° C. and removing a liquid fuel from said second reactor as product.

4,018,664
METHOD FOR REDUCING MINERAL CONTENT OF SLUDGE

Frederick A. Bain, Willowdale, and John O. L. Roberts, Toronto, both of Canada, assignors to Great Canadian Oil Sands Limited, Toronto, Canada

Filed May 27, 1975, Ser. No. 580,852
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE **4 Claims**

1. A method for treating the sludge layer of a retention pond associated with the hot water extraction of bitumen from tar sands said sludge layer containing 20 to 50% solids including 0.5 to 25.0% bitumen comprising:

a. withdrawing said sludge from the retention pond;
b. diluting and mixing said sludge with additional water to provide a sludge stream containing 6 to 18% solids;
c. settling said diluted sludge to form an upper layer of bituminous froth, a middle layer comprised of water having a substantially lower solids content than said sludge, and a lower layer containing a substantially higher solids content than said sludge;
d. recovering said middle layer, and
e. recovering said lower layer.

4,018,665
RECYCLING AERATED SCAVENGED MIDDLINGS TO CONDITIONING STEP OF HOT WATER EXTRACTION PROCESS

Joseph C. Anderson, Fort McMurray, Canada, assignor to Great Canadian Oil Sands Limited, Toronto, Canada

Continuation of Ser. No. 507,823, Sept. 20, 1974, abandoned. This application July 26, 1976, Ser. No. 708,790
Int. Cl.² G10G *1/04*
U.S. Cl. 208—11 LE **5 Claims**

5. In a hot water extraction process for the recovery of bitumen from tar sands including the steps of:

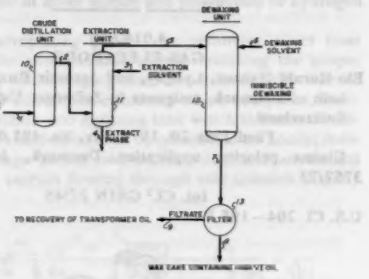
a. forming a mixture of tar sands and water;
b. settling the mixture in a separation zone to form an upper bitumen froth layer, a sand tailings layer, and a middlings layer containing water, silt, clay, and bitumen;
c. separately recovering the bitumen froth layer and the sand tailings layer;
d. passing a stream of middlings to an air scavenger zone and therein aerating said middlings to provide additional bitumen froth and an aerated bitumen depleted middlings material stream; and
e. recovering the additional bitumen froth;

an improvement which comprises adding at least some of the aerated bitumen-depleted middlings material stream from step (d) in an aerated condition, to the mixture being formed in step (a).

4,018,666
PROCESS FOR PRODUCING LOW POUR POINT TRANSFORMER OILS FROM PARAFFINIC CRUDES

Lloyd E. Reid, Sarnia, and David A. Gudelis, Mississauga, both of Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed July 28, 1975, Ser. No. 599,690
Int. Cl.² C10G *43/08*
U.S. Cl. 208—36 **16 Claims**



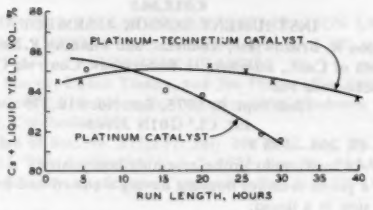
1. A process for producing a low pour point transformer oil which comprises:

a. solvent extracting a waxy distillate fraction of a paraffinic crude, said fraction having a 5 to 95% boiling range of 595° to 755° F at atmospheric pressure, to produce an extract and a raffinate;
b. solvent dewaxing said raffinate at a temperature of from about −10° to −40° F under liquid-liquid immiscible conditions to form a three-phase slurry containing a solid waxy phase, an oil-rich liquid phase and a solvent-rich liquid phase;
c. filtering said slurry at a temperature of from about −10° to about −40° F to form a filtrate substantially comprising the solvent-rich phase which contains the desired transformer oil, and a wax cake containing the oil-rich phase; and
d. recovering a low pour point transformer oil from said filtrate only by removing solvent from same.

4,018,667
HYDROCARBON CONVERSION PROCESS

Melvin M. Holm, Alameda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 801,008, Feb. 20, 1969, Pat. No. 3,968,025. This application Nov. 24, 1975, Ser. No. 634,801
Int. Cl.² C10G *35/06*
U.S. Cl. 208—134 **4 Claims**



1. A process for reforming a naphtha which comprises contacting said naphtha and hydrogen with a catalyst comprising a catalytic metal component consisting essentially of 0.1 to 10 weight percent technetium in association with a porous carrier at naphtha reforming conditions.

4,018,668
HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC SULFUR-FREE CATALYTIC COMPOSITE

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 16, 1975, Ser. No. 541,674
Int. Cl.² C10G *35/08*; B01J *23/74*; C10G *13/02*; C07C *5/28*
U.S. Cl. 208—139 **18 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic sulfur-free catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal selected from the group consisting of iridium, rhodium and palladium, about 0.1 to about 3.5 wt. % halogen, lead in an atomic ratio to platinum group metal of about 0.5:1 to about 1.5:1 and cobalt in an atomic ratio to platinum group metal of at least 5:1 to about 25:1, wherein the platinum group metal, cobalt, and lead are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the lead is present in an oxidation state above that of the elemental metal, and wherein substantially all of the cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions.

4,018,669
HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, and Ernest L. Pollitzer, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application May 17, 1976, Ser. No. 687,135
Int. Cl.² C10G *35/08*
U.S. Cl. 208—139 **23 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.05 to about 5 wt. % cobalt and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium, and catalytically available cobalt are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

4,018,670
HYDROCARBON CONVERSION PROCESS

John H. Sinfelt, Berkeley Heights, and Allan E. Barnett, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

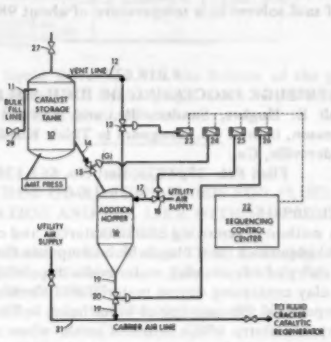
Continuation-in-part of Ser. No. 194,461, Nov. 1, 1971, Pat. No. 3,850,747, which is a continuation-in-part of Ser. No. 883,601, Dec. 9, 1969, abandoned. This application July 30, 1974, Ser. No. 493,126
Int. Cl.² C10G *35/08*; B01J *11/18*
U.S. Cl. 208—140 **17 Claims**

1. A hydrocarbon conversion process which comprises contacting a hydrocarbon feedstock, under conversion conditions, with a catalyst comprising greater than 0.1 wt. % iridium, based on total catalyst and 0.1 to 1.0 wt. % of at least one additional catalyst metal selected from the group consisting of ruthenium, rhodium, palladium, osmium, platinum, copper and silver, based on total catalyst, said iridium and additional catalyst metal being present on a refractory support and in an atomic ratio varying from 1:10 to 10:1, the surface area of said iridium and additional catalyst metal on said support being at least 200 square meters per gram of said iridium and additional catalyst metal as determined by carbon monoxide chemisorption techniques, depositing carbonaceous materials on the surface of said catalyst as a result of the hydrocarbon conversion process, and periodically regenerating said catalyst by burning substantially all of the carbonaceous materials from said catalyst in the presence of oxygen while maintaining the temperature during said burning below about 850° F. and thereby maintaining the surface area of the iridium and additional catalyst metal above about 150 square meters per gram.

4,018,671
INTERMITTENT CATALYST ADDITION SYSTEM

Nicholaki A. Andon, Westland, and Robert I. Fleece, Detroit, both of Mich., assignors to Marathon Oil Company, Findlay, Ohio

Filed Jan. 24, 1975, Ser. No. 543,719
Int. Cl.² C10G *9/32*
U.S. Cl. 208—152 **6 Claims**



1. In the catalytic conversion of feed materials by contacting said feed materials in a converter system with catalyst in a fluidized state, some of which catalyst is lost from said catalytic cracking process through reduced activity and/or entrainment in the effluent from said process, the improvement comprising:

a. storing said catalyst in a storage tank maintained at a first internal pressure and having a conduit communicating through a storage valve with an addition hopper;

b. maintaining said addition hopper at a pressure corresponding substantially to said first pressure of said storage tank by operaton of a venting means and opening said storage valve to admit said catalyst to a predetermined level in said addition hopper, said addition hopper communicating through an addition valve to a carrier gas line leading to said converter;

c. closing said venting means and pressurizing said addition hopper to a second addition pressure;

d. thereafter opening said addition valve and permitting said addition hopper to empty into said carrier gas line;

e. after emptying of said addition hopper, closing said addition valve, opening said venting means to reduce the pressure in said addition hopper to said first pressure, and opening said storage valve to admit additional catalyst to fill said addition hopper to a predetermined level determined by the volume of said addition hopper;

f. thereafter closing said venting means, closing said storage valve and admitting additional gases to raise the pressure of said addition hopper to said addition pressure;

g. thereafter opening said addition valve to admit additional catalyst to said carrier gas line and repeating the above cycle.

4,018,672

HYDRODESULFURIZATION CATALYST AND PROCESS UTILIZING THE SAME

William R. Moser, Wayland, Mass., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 11, 1975, Ser. No. 639,867
Int. Cl.² C10G 23/02
U.S. Cl. 208—216 11 Claims

1. In a process for the hydrodesulfurization of a sulfur-containing hydrocarbon oil which comprises contacting said oil under hydrodesulfurization conditions with hydrogen and a catalyst comprising an alumina support composited with a hydrogenation component, said hydrogenation component being selected from the group consisting of at least one elemental metal, metal oxide and metal sulfide of a Group VIB element of the Periodic Table of Elements and at least one elemental metal, metal oxide and metal sulfide of a Group VIII element of the Periodic Table of Elements, the improvement which comprises said alumina having been prepared by hydrolyzing an aluminum alcoholate to aluminum hydroxide, and thermally decomposing said aluminum hydroxide in a solvent selected from the group consisting of C1 to C4 alcohols, acetone, methyethylketone, cyclic ethers and tetrahydrofuran, at a temperature ranging from above the critical temperature of said solvent to a temperature of about 980° C.

4,018,673

CENTRIFUGE PROCESSING OF HIGH-SOLIDS CLAY

Randall E. Hughes, Sandersville, and Edward P. Jordan, Thomson, both of Ga., assignors to Thiele Kaolin Company, Sandersville, Ga.

Filed Feb. 27, 1976, Ser. No. 662,135
Int. Cl.² B03B 1/04
U.S. Cl. 209—5 15 Claims

1. A method of removing coarse materials and chemical and mineral impurities from clay, which comprises forming a high solids slurry of a crude clay, water and a dispersing agent, said crude clay containing coarse material and chemical and mineral impurities, the quantity of water being sufficient to form a pumpable slurry which will not settle when subjected to static forces for 24 hours, the amount of said dispersing agent being sufficient to obtain the minimum viscosity for said slurry; subjecting said slurry to intense centrifugal forces for a short period of time; separating said coarse material and said chemical and mineral impurities; and recovering the suspended clay as a fine fraction having a reduced content of coarse material and reduced content of chemical and mineral impurities.

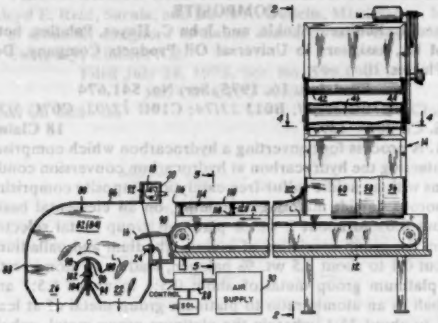
4,018,674

APPARATUS FOR AUTOMATICALLY GRADING LEAF TOBACCO

Bennie A. Morris, 206 W. Lavender Ave., Durham, N.C. 27704

Continuation-in-part of Ser. No. 228,965, Feb. 24, 1972, abandoned. This application Nov. 26, 1974, Ser. No. 527,362
Int. Cl.² B07C 5/342
U.S. Cl. 209—73 25 Claims

1. In the system for sorting tobacco leaf wherein said leaves are carried on a horizontal endless belt conveyor past a sensing station, the method of delivering said leaves from a source to said conveyor comprising the steps of feeding within an enclosed housing vertically disposed above said conveyor a random stream of said leaves so as to fall perpendicularly to said conveyor deflecting said leaves in a plurality of selected paths, each intersecting a major portion of said perpendicularly falling stream within said housing transversely to the direction of movement of said conveyor before reaching said conveyor, each of said selected paths being inclined in a direction obliquely angular to the perpendicular direction of the said falling stream, the direction of movement of the conveyor and the plane of said conveyor to cause the leaves within said falling stream to be deflected at different times and move relative to each other sequentially downwardly at angles to the



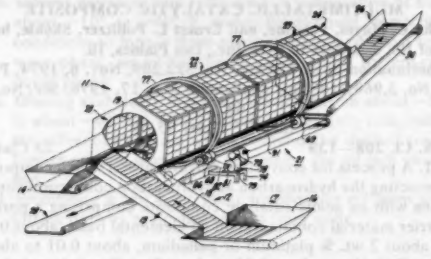
direction of said vertical stream, the conveyor and the direction of movement of said conveyor and depositing said leaves on said conveyor in spaced orientation.

4,018,675

WASTE SORTING MACHINE

Ben G. Petrucci, 6781 13th St., Sacramento, Calif. 95831

Filed May 19, 1975, Ser. No. 578,611
Int. Cl.² B07C 1/10
U.S. Cl. 209—86 5 Claims



1. A waste sorting machine comprising:
a. a frame:
b. an elongated, polygonal in cross-section trommel extending from an input end to an output end, the walls of said trommel being formed of screen having a predetermined mesh size incapable of supporting waste material smaller than said mesh size,
1. each side of said polygonal in cross-section trommel including a plurality of panels covered by said screen and extending consecutively between said input end and said output end, said predetermined mesh size on at least some of said panels varying in dependence upon the distance from said input end and the side of said trommel on which said panel is located,
2. at least some of said panels adjacent said input end carrying screen of relatively large mesh size and the remaining panels adjacent said input end carrying screen of relatively small mesh size,
3. at least some of said panels adjacent said output end carrying screen of relatively large mesh size and the remaining panels adjacent said output end carrying screen of relatively small mesh size;
c. means for mounting said trommel on said frame for rotation about the longitudinal axis of said trommel, said axis being inclined downwardly from said input end toward said output end in order gravitally to advance waste material entering said input end as said trommel is rotated, and

to discharge through said output end material larger than said mesh size;

d. means for rotating said trommel;

e. a plurality of rods mounted on said trommel, said rods projecting into the interior of said trommel and being capable of engaging said material larger than said mesh size in the floor portion of said trommel and elevating the same as said trommel is rotated, said rods being incapable of supporting said material larger than mesh size when said rods approach an inverted position adjacent the ceiling portion of said trommel,

1. said material larger than said relatively rigid including rectangular panels of relatively heavy and rigid corrugated board plus sheets of pliable light gauge material, and wherein said relatively large size mesh provides a plurality of openings through which a substantial portion of the corners of said rectangular panels can protrude as said material larger than said mesh size falls away from said rods when said rods approach said inverted position, said corners of said relatively rigid corrugated board panels being capable of engaging and poking subjacent ones of said pliable sheets downwardly through respective ones of said openings to a location outside said trommel while said relatiely ridgid corrugated board panels remain inside said trommel;

f. conveyor means located adjacent said output end for carrying away said material larger than said mesh size advancing through said trommel and discharging through said output end; and,

g. means below said trommel for removing said material smaller than said mesh size passing downwardly through said screen in the vicinity of said floor portion of said trommel.

4,018,676

REMOVAL OF EXPLOSIVE MATERIALS FROM WATER BY CHEMICAL INTERACTION ON STRONGLY BASIC ION EXCHANGE RESINS

John C. Hoffsommer; Lloyd A. Kaplan, both of Silver Spring; Donald A. Kubose, Olney, and Donald J. Glover, Columbia, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 15, 1976, Ser. No. 649,441
Int. Cl.² B01D *15/00*
U.S. Cl. 210—24 5 Claims

1.A method for the removal of a hydrolyzable, non-aromatic, nitroso- or nitro-substituted explosive compound, or mixture of said compounds from an aqueous solution containing said compound or mixture thereof which comprises passing said aqueous solution through, and in contact with, a bed of the hydroxyl form of a strongly basic anion exchange resin, whereby said compound or mixture thereof is substantially all removed from the aqueous solution and decomposed into non-toxic products.

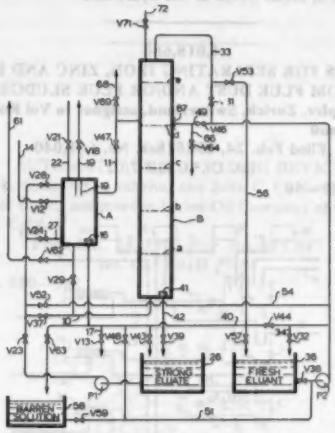
4,018,677

METHOD OF STRIPPING SOLID PARTICLES

Alexander Himsley, Toronto, Canada, assignor to Himsley Engineering Limited, Toronto, Canada

Filed Mar. 18, 1976, Ser. No. 668,088
Int. Cl.² B01D *15/06*
U.S. Cl. 210—33 10 Claims

1. A method of stripping solid particles loaded with material to be eluted therefrom, wherein the loaded particles are supplied in the form of an input slurry in a carrier liquid, comprising the steps of: establishing an upwardly-extending elution column containing a plurality of batches of the particles in vertically adjacent layers, said elution column holding an eluant liquid which contains progressively higher concentrations of the eluted material toward the bottom thereof: intermittently flowing a stripping eluant liquid downwardly through said column and concurrently therewith discharging strong eluate from the bottom of the column; isolating a batch of the input slurry; separating the carrier liquid from said isolated batch; slurrying said isolated batch after separation of



the carrier liquid therefrom into the bottom of the column with strong eluate; and discharging a batch of particles from the uppermost level of the column.

4,018,678

METHOD OF AND APPARATUS FOR FLUID FILTRATION AND THE LIKE WITH THE AID OF CHITOSAN

Quintin P. Peniston, Rte. 7, Box 7710, Bainbridge Island, Wash. 98110, and Edwin Lee Johnson, Rte. 5, Box 4246, Issaquah, Wash. 98027

Filed Aug. 9, 1974, Ser. No. 496,123
Int. Cl.² B01D *53/16*
U.S. Cl. 210—36 12 Claims

1. A method of fluid-flow filtration that comprises providing a filtration bed having chitosan disposed throughout the bed with a high ratio surface-to-volume of exposed reactive amino groups of the chitosan, and passing fluid containing constituents reactive with said amino groups through the filtration bed.

12. A method of removing from cigarette smoke constituents comprising pyrolysis products, acrolein, formic and acetic acids, acetaldehyde, phenols and negatively charged particles, that comprises providing a filtration region having chitosan disposed throughout the region with a high ratio surface-to-volume of exposed reactive amino groups of the chitosan, and passing the smoke through the filtration region.

4,018,679

METHOD OF RENDERING WASTE SUBSTANCES HARMLESS

Friedrich Bölsing, Bahnhofstrasse 3, 4965 Lindhorst, Germany

Continuation-in-part of Ser. No. 192,333, May 10, 1971, Pat. No. 3,897,238. This application May 31, 1974, Ser. No. 475,341
Claims priority, application Germany, June 6, 1973, 2328777; June 6, 1973, 2338778
Int. Cl.² C02C *5/02*
U.S. Cl. 210—36 12 Claims

1. A method for rendering harmless an oily waste material comprising mixing an alkaline earth metal oxide with about 0.001 to 10% its weight of a surface active agent which temporarily delays reaction between the alkaline earth metal oxide and water until after the alkaline earth metal oxide was inter-

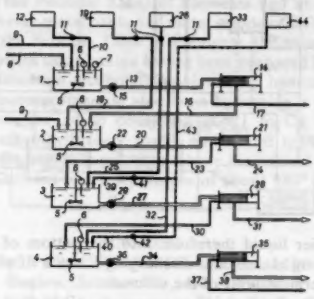
acted with the oily waste material, combining the alkaline earth metal oxide carrying the surface active agent with said oily material, and reacting the alkaline earth metal oxide charged with the waste material with water to convert the alkaline earth metal oxide to the hydroxide.

4,018,680

PROCESS FOR SEPARATING IRON, ZINC AND LEAD FROM FLUE DUST AND/OR FLUE SLUDGE

Rudolf Kupfer, Zurich, Switzerland, assignor to Vol Roll A.G., Switzerland

Filed Feb. 24, 1976, Ser. No. 661,040
Int. Cl.² C22B 7/02
U.S. Cl. 210—50 **4 Claims**



1. A process for separating iron, zinc and lead from a weakly alkaline flue dust and/or flue sludge wherein said flue dust and/or flue sludge are suspended in aqueous phase comprising the sequential steps of

treating said aqueous suspension with sufficient hydrogen peroxide so as to oxidize iron whereby said treated aqueous suspension comprises a first liquid phase and a first solid phase;

separating said first liquid phase and said first solid phase by filtration so as to produce a first filtrate and a first solid residue;

suspending said first solid residue in an aqueous phase and treating said aqueous suspension of said first solid residue with sufficient hydrochloric acid so as to change the pH of said aqueous suspension of said first solid residue to about 5 whereby said treated aqueous suspension of said first solid residue comprises a second liquid phase and a second solid phase;

separating said second liquid phase and said second solid phase by filtration so as to produce a second solid residue, consisting essentially of iron sludge and a second filtrate;

treating said second filtrate with sufficient milk of lime so as to change the pH of said second filtrate to about 8.3 whereby said treated second filtrate comprises a third liquid phase and a third solid phase;

and separating said third liquid phase and said third solid phase by filtration so as to produce a third solid residue comprising lead and zinc, and a third filtrate substantially free of dissolved heavy metals.

4,018,681

FILTRATION OF CELLULOSIC SOLUTIONS

Edmund M. LaPolla, Parsippany; Charles F. Murphy, Morristown, and Arthur Sarkisian, Cranford, all of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 297,406, Oct. 13, 1972, abandoned. This application Nov. 12, 1975, Ser. No. 631,370
Int. Cl.² B01D 37/00
U.S. Cl. 210—66 **10 Claims**

1. A process for the filtration of viscose cellulosic solutions containing less than 1% of undissolved cellulosic materials comprising

filtering the cellulosic solution through a bed of particulate material inert to the cellulosic solution until the build-up of undissolved material in the bed impedes the further flow of solution through the bed,

mixing the particulate bed and build-up of undissolved material with a sodium hydroxide solvent therefor substantially free of cellulosic material to partially dissolve undissolved cellulosic material, the partial solution of said undissolved cellulosic material being highly concentrated relative to its concentration in the original cellulosic solution, the concentration being at least 25 times the concentration of the original solution,

adding carbon bisulfide substantially free of cellulosic material to said concentrated solution in an amount by weight in excess of the amount by weight of the undissolved material to complete the solution of the undissolved cellulosic material,

separating the solution from the particulate bed, and

recycling to unfiltered cellulosic solutions the reactant containing solution of cellulosic material.

4,018,682

FREEZE-THAW METHOD FOR REDUCING MINERAL CONTENT OF A CLAY-WATER MIXTURE

Jackson S. Boyer, Wilmington, Del., assignor to Sunoco Energy Development Co., Dallas, Tex.

Filed Sept. 8, 1975, Ser. No. 610,953
Int. Cl.² B01D 35/18; C02B 1/02
U.S. Cl. 210—71 **7 Claims**

1. A method for reducing the clay content of a colloidal clay-water mixture which comprises:

a. combining said mixture with air at a pressure of at least 25 p.s.i.g.;

b. rapidly expanding the air-colloidal clay-water mixture by passing said mixture through a constriction into an atmosphere of sufficiently lower pressure to cause the water in the mixture to atomize, and at a temperature below 32° F to cause the atomized water to freeze into ice crystals containing said clay in a concentrated, non-colloidal form;

c. spraying said clay-containing ice crystals on the ground; and

d. melting said ice crystals containing said non-colloidal clay whereby the melted ice percolates through the ground and the clay remains behind to provide a direct separation of water and clay.

4,018,683

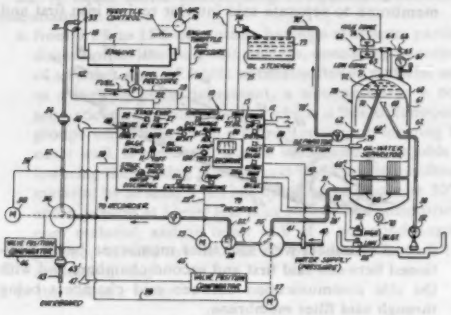
BILGE WATER DISPOSAL SYSTEM INCLUDING OIL RECOVERY MEANS

Chester H. Walters, St. Louis; Harold J. Barmeier, Jr., Baliwin, both of Mo., and Greig E. Sullivan, Marshalltown, Iowa, assignors to National Marine Service, Inc., St. Louis, Mo.

Filed Dec. 9, 1974, Ser. No. 530,539
Int. Cl.² B01D 1/14
U.S. Cl. 210—71 **16 Claims**

1. A disposal system for bilge water mixed with another immiscible fliuid having a different specific gravity than water, comprising: a separator means for separating the bilge water from said other fluid and producing clean processed water substantially free of said other fluid; an outlet for the processed water at the separator; separator feed conduit means for carrying bilge water to the separator; means for supplying bilge water to the separator through said separator feed conduit means; an internal combustion engine; an exhaust duct for carrying exhaust gases from said engine; means for sensing the temperature of exhaust gases flowing in said duct at a predetermined area of the duct; exhaust duct feed conduit means for carrying processed water from the separator di-

rectly to the interior of the exhaust duct through a sidewall area thereof near said predetermined area; means for causing flow of processed water from said processed water outlet directly to said exhaust duct for flash vaporization therof; first means for disabling the flow causing means when the temperature of the engine exhaust gases are sensed as being below a predetermined minimum flash vaporization temperature at the predetermined area of the exhaust duct; means for sensing whether the engine is operating or not; means for sensing the



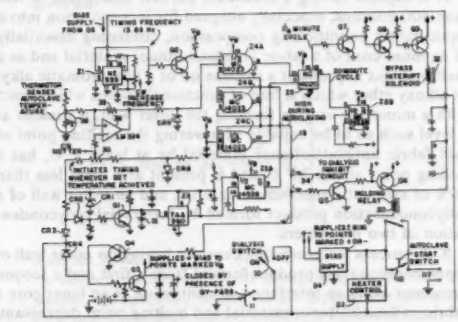
power level setting of the engine; second means for disabling the processed water flow causing means if the engine is not operating; third means for disabling the flow causing means if a predetermined power level setting is not sensed; and a control system for disabling said processed water flow causing means unless and until actual operation of the engine, a predetermined power level setting of the engine and a predetermined minimum flash vaporization temperature are sequentially sensed in the recited order by the respective sensing means.

4,018,684

ELECTRONIC AUTOCLAVE TIMING CIRCUIT FOR KIDNEY DIALYSIS APPARATUS

Michael B. Uffer, Baltimore, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed July 31, 1975, Ser. No. 600,594
Int. Cl.² B01D *31/00*
U.S. Cl. 210—140 **7 Claims**



6. In a kidney dialysis machine:

electric heating means to raise the machine temperature to a desired autoclaving temperature;

control means to maintain said autoclaving temperature for a desired total elapsed interval with time out means effective during lapses in said desired autoclaving temperature; and

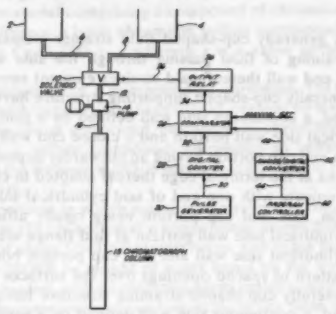
means for periodically shifting the flow of fluids in said kidney dialysis machine between all critical alternative fluid flow paths during said desired total elapsed interval; whereby all critical fluid flow pathways in said kidney dialysis machine are autoclaved.

4,018,685

AUTOMATIC LIQUID MIXING DEVICE

Dennis L. Saunders, Anaheim, and John C. Caldwell, Pomona, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Oct. 24, 1975, Ser. No. 625,577
Int. Cl.² B01D *15/08*
U.S. Cl. 210—141 **21 Claims**



1. An apparatus for mixing a plurality of liquid components in pre-selected proportions to form a mixture of said liquid components having a desired composition, which comprises:

a plurality of liquid component storage reservoirs at least one of said reservoirs being available for each of the liquid components of said mixture;

a pump for withdrawing liquid component from said plurality of reservoirs;

switching means for successively connecting the suction of said pump to each of said plurality of liquid reservoirs;

a conduit connected to the discharge of said pump for delivering said liquid mixture to a point of use;

pulse generating means to generate a series of constant frequency electrical pulses;

a digital counter electrically connected to the output of said pulse generating means for counting the number of pulses emitted from said pulse generating means during each operating cycle, said digital counter having a binary coded decimal output;

comparator means electrically connected to the output of said digital counter for comparing the number of pulses registered on said digital counter with an adjustable, pre-selected value; and

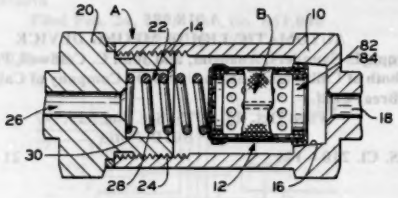
electrical output means electrically connected to the output of said comparator means responsive to a signal from said comparator means for actuating said switching means to switch the suction of said pump from one of said liquid reservoirs to another of said reservoirs when the number of pulses registered on said digital counter equals the pre-selected value set into said comparator means and to reconnect the suction of said pump to the original reservoir at the start of each operating cycle;

whereby liquid components are successively pumped from each of said reservoirs for individually controlled short time intervals and admixed to provide a mixture of said components having the desired composition.

4,018,686
FLUID STRAINER ELEMENT

Earl D. Shufflebarger, Mentor; Edward E. Kish, Kirtland; Frank M. Cunningham, Solon; John R. Boylan, Euclid, and Donald J. Murauskas, Painesville, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

Filed July 10, 1975, Ser. No. 594,612
Int. Cl.² B01D *29/14*
U.S. Cl. 210—448 **14 Claims**



1. A generally cup-shaped fluid strainer element allowing the straining of fluid passing through the side walls and a closed end wall thereof, said strainer element comprising:

a generally cup-shaped supporting structure having an open end, a continuous side wall defined by a generally cylindrical side wall portion and a closed end wall defined by an end cap portion having an outwardly depending flange area at the terminal edge thereof adapted to closely communicate with one end of said cylindrical side wall portion, said end cap portion being rigidly affixed to said cylindrical side wall portion at said flange area with said cylindrical side wall and end cap portion both having a pattern of spaced openings over the surfaces thereof;

a generally cup-shaped straining structure having an open end, a continuous side wall defined by a generally cylindrical side wall portion and a closed end wall defined by an end cap portion having an outwardly extending flange area at the terminal edge thereof adapted to communicate with one end of said cylindrical side wall portion, said end cap portion being rigidly affixed to said cylindrical side wall portion at said flange area with said straining structure cylindrical side wall and end cap portions being constructed from a wire mesh and dimensioned to be closely received over said support structure with the open ends of said supporting and straining structures being substantially coterminous with each other; and,

a binding ring having a generally U-shaped cross-section closely received over and rigidly affixed to the substantially coterminous open ends of said supporting and straining structures with one leg of said U-shaped cross-section being received over a portion of the inner surface of said supporting structure cylindrical side wall portion and the other leg of said U-shaped cross-section being received over a portion of the outer surface of said straining structure cylindrical side wall portion.

4,018,687
GLASS-ENCLOSED INTEGRAL GLASS AND CERAMIC FILTER UNIT

Robert Theodore Zahour, Easton, Pa., assignor to J. T. Baker Chemical Company, Phillipsburg, N.J.

Filed July 26, 1976, Ser. No. 708,327
Int. Cl.² B01D *27/00*
U.S. Cl. 210—448 **14 Claims**

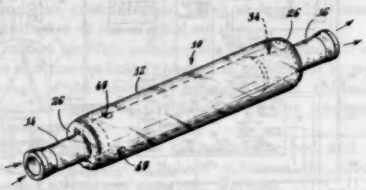
1. A totally glass-enclosed integral glass and ceramic filter unit for removal of particulate matter from sulfuric acid and from other liquid solutions which do not attack silica comprising:

a glass envelope having first and second glass ports integral therewith, said first and second ports each providing communication from the exterior of said envelope with the interior region therein,

said envelope together with its ports forming an integral glass housing enclosing said region,

a microporous ceramic filter membrane positioned within said region, said filter membrane having a border extending therearound,

a glass seal wall member having first and second borders, a first border of said wall member being fused to the border of said filter membrane, the second border of said wall member being fused to the interior of said housing for causing said glass wall member together with said filter membrane to separate said interior region into first and



second chambers with said filter membrane being positioned between said first and second chambers and with the sole communication between said chambers being through said filter membrane,

said first glass port communicating with said first chamber and said second glass port communicating with said second chamber, and

said glass seal wall member including glass material having a coefficient of thermal expansion intermediate the coefficients of thermal expansion of said ceramic filter membrane and of said glass housing for forming a transition therebetween.

4,018,688
CAPSULES, PROCESS OF THEIR PREPARATION AND FABRIC CONDITIONING COMPOSITION CONTAINING SAID CAPSULES

Hans J. Pracht, Cincinnati, and Stephen H. Iding, Sharonville, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed July 21, 1975, Ser. No. 597,867
Int. Cl.² B01J *13/00*; D06M *13/18*, *13/26*, *13/34*
U.S. Cl. 252—8.6 **29 Claims**

1. A capsule having a maximum particle dimension of less than 400 microns, especially adapted for incorporation into a liquid fabric conditioning composition, consisting essentially of an inner core of a fabric antistat/softener material and as a melting point depressant a silicone oil or a non-aromatic alkyl or alkoxy ether which is free of functional groups which react with a monomer used in forming the outer wall, is present at a level such as to be capable of lowering the melting point of said fabric antistat/softener material by at least 5° C, has a boiling point above 30° C and is present at a level less than 50% of said antistat/softener material; and an outer wall of a polycondensation product formed by interfacial polycondensation of two monomers.

8. A process for producing capsules having an outer wall of a polycondensation product formed from a first and a second monomer along an interface and containing as an inner core a fabric antistat/softener material and melting point depressant, said capsules having a maximum particle dimension of less than 400 microns, comprising the steps of:

a. melting a fabric antistat/softener material and adding to it a melting point depressant, whereby the melting point depressant is a silicone oil or a non-aromatic alkyl or alkoxy ether free of functional groups which react with the first monomer, is present at a level such as to be capable of depressing the melting point of the fabric antistat/softener material by at least 5° C, is added at a level below 50% based on the fabric antistat/softener material and has a boiling point greater than 30° C;

b. forming a solution of the melted fabric antistat/softener material and melting point depressant of step (a) with the first monomer;

c. forming an aqueous solution of the second monomer; and

d. adding under agitation the solution of step (b) to the solution of step (c) to form the capsules along the interface of the two solutions wherein a degree of stirring is employed such that the maximum particle dimension of the capsules so formed is less than 400 microns.

22. A liquid fabric conditioning composition, consisting essentially of:

a. from 0.1% to 15% of capsules having a maximum particle dimension of less than 400 microns, consisting essentially of an inner core of fabric antistat/softener material and, as a melting point depressant, a silicone oil or a non-aromatic alkyl or alkoxy ether which is free of functional groups which react with a monomer used in forming the outer wall, is present at a level such as to be capable of lowering the melting point of said fabric antistat/softener material by at least 5° C, has a boiling point above 30° C and is present at a level less than 50% of said antistat/softener material; and an outer wall of a polycondensation product formed by interfacial polymerization of two monomers; and

b. the balance water.

4,018,689

COMPOSITION AND METHOD FOR REDUCING THE SURFACE TENSION OF AQUEOUS FLUIDS

James L. Thompson, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 527,576, Nov. 27, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,596

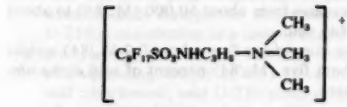
Int. Cl.² E21B 43/26, 43/27

U.S. Cl. 252—8.55 C 14 Claims

1. An aqueous composition suitable for use in treating subterranean formations comprising:

A. an aqueous liquid; and dispersed in said aqueous liquid,

B. an effective amount of a perfluorinated surfactant of the formula



wherein A^- is Cl^-, F^-, I^- or Br^-;

C. a second surfactant blend comprising as percent by weight, 57 percent polyethylene glycol monostearate; 19.2 percent sodium di(2-ethylhexyl) sulfosuccinate; 3.0 percent di-2-ethylhexyl maleate; 10.1 percent isooctyl alcohol; 4.5 percent isopropyl alcohol and 6.2 percent water; and

D. a third surfactant selected from the group consisting of an adduct of a C_{16}–C_{18} alcohol with five moles of ethylene oxide, an adduct of trimethyl-1-heptanol with seven moles of ethylene oxide, and mixtures thereof; the total amount of said perfluorinated compound and other surfactants being present in said aqueous liquid in an amount ranging from about 0.02 to about 0.2 percent by weight of said composition.

4,018,690

PROCESS FOR PREPARING SULFUR-CONTAINING FERROMAGNETIC CHROMIUM OXIDE

Harry Robbins, Los Angeles, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 351,116, April 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 196,715, Nov. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 84,866, Oct. 28, 1970, abandoned. This application Apr. 9, 1975, Ser. No. 566,548

Int. Cl.² C01G 37/02

U.S. Cl. 252—62.51 12 Claims

1. In a process in which material comprising a compound of chromium (III) is heated at a temperature above 200° C, at a pressure of about 50–3000 atmospheres, and in the presence of about 1–300% by weight of water based on the weight of compound heated, with an oxidizing agent under conditions to prepare a ferromagnetic chromium oxide in the form of fine, acicular particles of tetragonal crystal structure of the rutile type ranging up to two microns in length and having a median axial ratio of greater than 2:1, the improvement according to which said material comprising a compound of chromium (III) is selected from a. a basic chromium sulfate corresponding to the formula $Cr_xO_x(SO_4)_{3-x}$ wherein x is a value up to 2.99, and

b. a combination of a compound of chromium (III) combined with oxygen and about 0.1–25 percent by weight of said chromium compound, calculated as chromium dioxide, of a sulfate compound, calculated as sulfate ion, having the formula R_2SO_4 wherein R is an organic radical, H or NH_4.

10. In a process in which material comprising a compound of chromium (III) is heated at a temperature above 200° C, at a pressure of about 50–3000 atmospheres, and in the presence of about 1–3000% by weight of water based on the weight of compound heated, with an oxidizing agent under conditions to prepare a ferromagnetic chromium oxide in the form of fine, acicular particles to tetragonal crystal structure of the rutile type ranging up to two microns in length and having a median axial ratio of greater than 2:1, the improvement according to which said material comprising a compound of chromium (III) is selected from

a. a combination of a compound of chromium (III) combined with oxygen and about 0.1–25 percent by weight of said chromium compound, calculated as chromium dioxide, of a sulfate compound, calculated as sulfate ion, having the formula $M(H_ySO_4)_{v(y+1)/2}$ wherein M is a trivalent or tetravalent cation other than chromium, v is the valence of M and y is 0 or 1, and

b. a combination of a compound of chromium (III) combined with oxygen and about 0.1–25 percent by weight of said chromium compound, calculated as chromium dioxide, of a non-sulfate material calculated as chromium dioxide, of a non-sulfate material calculated as sulfate ion, which contains at least one sulfur atom and yields sulfate upon oxidation.

4,018,691

ARYL SULFONATE-ALDEHYDE COMPOSITION AND PROCESS FOR ITS PREPARATION

John A. Neal, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Aug. 28, 1975, Ser. No. 608,462

Int. Cl.² G01N 27/82; H01F 1/00

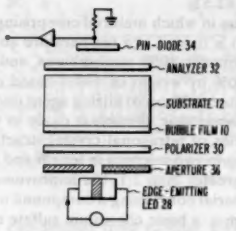
U.S. Cl. 252—62.54 18 Claims

2. A condensation product of a sulfonated phenol and aldehyde chemically combined with iron to form a ferromagnetic iron composition.

4,018,692
COMPOSITION FOR MAKING GARNET FILMS FOR IMPROVED MAGNETIC BUBBLE DEVICES

Aline Akselrad, Princeton, and Richard Edwin Novak, East Windsor, both of N.J., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 403,393, Oct. 4, 1973, abandoned. This application Mar. 13, 1975, Ser. No. 558,146
Int. Cl.² G11C *19/08*; C04B *35/40*
U.S. Cl. 252—62.57 **2 Claims**



1. A flux composition from which single crystal garnet films having growth induced uniaxial anisotropy can be epitaxially grown which comprises essentially of about 75 mol percent of lead oxide, about 15 mol percent of bismuth oxide, from about 8 – 8.5 mol percent of iron oxide, from about 0.5 – 1.0 mol percent of an oxide selected from one or more of the group consisting of yttrium oxide and trivalent rare earth oxides and from about 1 – 1.5 mol percent of gallium oxide, aluminum oxide or a mixture of gallium and aluminum oxides.

4,018,693
TRANSFORMER OILS

Theodore C. Mead, Port Arthur, and William B. Ashton, Nederland, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 21, 1974, Ser. No. 516,556
Int. Cl.³ H01B *3/22*
U.S. Cl. 252—64 **14 Claims**

1. A transformer oil comprising:
a. a naphthene or paraffin base oil ranging in viscosity about 40 to 200 SUS at 100° F and
b. a carbonyl compound chosen from the group consisting of aldehydes and ketones.

2. An oil as in claim 1 wherein the carbonyl compound is chosen from the group consisting of dialkyl ketones, aryl aldehydes, alkyl cycloalkyl ketones, dicyclo alkyl ketones and diaryl ketones.

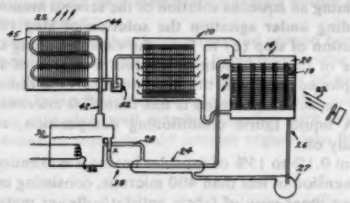
8. A transformer oil comprising:
a. a hydrogenated naphthene or paraffin base oil ranging in viscosity from about 40 to 200 SUS at 100° F and
b. a carbonyl compound selected from the group consisting of aldehydes and ketones.

4,018,694
ABSORPTION REFRIGERANT COMPOSITION

Philip P. Anderson, Newburgh, Ind., assignor to Arkla Industries Inc., Evansville, Ind.

Filed Oct. 2, 1975, Ser. No. 619,037
Int. Cl.² C09K *5/04*
U.S. Cl. 252—69 **3 Claims**

3. In a method of operating an absorption refrigeration system of the type in which refrigerant vapor is boiled away from a liquid absorbent-refrigerant composition, condensed, evaporated and absorbed in the liquid absorbent remaining after the boiling step the improvement comprising using as the absorbent-refrigerant composition a solution containing 10%–50% by weight of a lower aliphatic alcohol which is miscible with water, 10%–50% by weight water and 40%–70%



by weight of a salt selected from the group consisting of the halides of the alkali metals and the alkaline earth metals.

4,018,695
POLYMER-MODIFIED AUTOMATIC TRANSMISSION FLUID

William J. Heilman, Allison Park, and Thomas J. Lynch, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation of Ser. No. 448,069, March 4, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,325
Int. Cl.² C10M *1/18*
U.S. Cl. 252—73 **6 Claims**

1. A composition comprising one or more petroleum-based lubricating oil base stocks and a minor amount of a linear alpha-olefin copolymer produced by polymerization of a lower alpha-olefin monomer having from six to 10 carbon atoms or mixtures thereof admixed with from about 10 to about 25 mol percent of a higher alpha-olefin monomer having from 16 to 20 carbon atoms or mixtures thereof with substantially all of the alternate carbon atoms in each linear copolymer chain having randomly dependent therefrom an alkyl group derived from one of the alpha-olefin monomers and having two less carbon atoms than the alpha-olefin from which it is derived,

said alpha-olefin copolymer characterized by a weight average molecular weight M_w between about 50,000 (M_o/84) and about 500,000 (M_o/84), a number average molecular weight M_n between about 4,000 (M_o/84) and about 500,000 (M_o/84) where M_o is the average molecular weight of the mixture of alpha-olefin monomers,

a distribution factor M_w/M_n of between one and about 12, the upper limit of said distribution factor being about 12 when M_w is about 50,000 (M_o/84) and the upper limit of said distribution factor being about two when M_w is about 500,000 (M_o/84) with the upper limit of said distribution factor proportionately decreasing from about 12 to about two as M_w increases from about 50,000 (M_o/84) to about 500,000 M_o/84), and

said composition comprising from about 0.2 M_o/84) weight percent to about five (M_o/84) percent of said alpha-olefine copolymer.

4,018,696
LIQUID DETERGENT COMPOSITION

Karl Martin Edvin Hellsten, Odsmal, and Birgit Tora Gunvor Karlsson, Stenungsund, both of Sweden, assignors to Berol Kemi AB, Stenungsund, Sweden

Filed Nov. 20, 1975, Ser. No. 633,899
Claims priority, application Sweden, Nov. 25, 1974, 7414792
Int. Cl.² C11D *3/075*, *1/72*
U.S. Cl. 252—89 R **5 Claims**

1. A liquid aqueous detergent composition consisting essentially of an amount within the range from about 0.5 to 35% by weight of the composition of a surfactant and an amount within the range from about 10 to about 25% of a complexing agent the surfactant comprising

a. an amount within the range from about 30 to about 70% of a surface active nonionic alkylene oxide adduct having the formula

$$RO(A)_xH$$

where R represents a hydrocarbon group having from about eight to about twenty four carbon atoms, each A is an oxyalkylene group derived from an alkylene oxide having from about two to about four carbon atoms, x represents the number of A groups and is a number within the range from about 5 to 50 the number of oxyethylene groups being at least 60% of the total number of oxyalkylene groups; and

b. from about 30 to about 70% of a surface active phosphoric acid ester having the formula

$$(R'O)_yPO(OM)_{3-y}$$

where R' is alkyl having from nine to eleven carbon atoms, y is an integer of 1 or 2 and M is a monovalent cation.

4,018,697
FUEL CYCLE MANAGEMENT

Alvin E. Smith, Arcadia, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed May 2, 1975, Ser. No. 574,078
Int. Cl.² G21C *19/44*
U.S. Cl. 252—301.1 R **5 Claims**

1. In a fuel cycle management system in which fuel particles containing a predominant amount of a uranium compound and containing fissile material within the equivalent range from about 2 percent to about 5 percent uranium-235 are employed for generating energy in a light water nuclear reactor and in which the depleted fuel is reprocessed to remove higher actinides, to remove fission products, to recover plutonium, the recover a uranium composition containing less than 2 percent but more than 0.4 percent uranium-235, said recovered uranium composition containing uranium-236, and in which fuel particles comprising such recovered uranium are employed in another cycle of energy generation in a light water nuclear reactor, the improvement which consists of:

selectively enriching a stream of recovered uranium composition derived substantially exclusively from depleted fuel, said stream being substantially free from uranium which has not been cycled through a nuclear reactor, to provide a rejected tails fraction and an upgraded fraction containing a concentration of uranium-235 greater than in said recovered uranium, such concentration being within a range from 1 percent to 3 percent of uranium-235, said upgraded fraction containing less than 70 percent but more than 40 percent of the total quantity of uranium-236 isotope in the recovered uranium, the U-236 concentration in a sample of the upgraded fraction always being greater than the U-236 concentration in the corresponding sample of the recovered uranium prior to said enrichment, said U-236 concentration in the sample of upgraded fraction being within a range from 0.05 percent to 2 percent;

admixing said upgraded fraction with plutonium compounds and employing such admixture to provide nuclear fuel comprising both uranium and plutonium and having a fuel value equivalent to that of virgin nuclear fuels containing between 2 percent and 5 percent uranium-235, the concentration of plutonium compound in said fuel being sufficient both to compensate for the presence of uranium-236 and to care for any deficiency of uranium-235 in the said upgraded fraction of uranium, such plutonium concentration being within the range from 1 percent to 7 percent by weight, said fuel being substantially free from uranium-235 derived from other than recovered uranium composition, said fuel containing at least 1.0 percent but not more than 3.0 percent uranium-235 attributable only to said upgraded fraction.

4,018,698
CERIUM STABILIZED MAGNESIUM ALUMINUM GALLATE PHOSPHORS

Charles F. Chenot, Towanda, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 458,077, April 5, 1974, abandoned. This application Jan. 29, 1975, Ser. No. 545,171
Int. Cl.² C09K *11/46*
U.S. Cl. 252—301.4 R **2 Claims**

1. A luminescent composition consisting essentially of from about 99.97% to about 99.995% by weight of a manganese-activated magnesium aluminum gallate phosphor having the formula:

$$Mg_aMn_bAl_cGa_{2-c}O_{(3+a+b)}$$

wherein $a + b$ is from about 0.85 to about 1.05, b is from about 0.001 to about 0.05 and c is from about 0.01 to about 1.2 and from about 0.005% to about 0.03% by weight of trivalent cerium.

4,018,699
SURFACTANT COMPOSITION

Lowell B. Lindy, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 525,135, Nov. 19, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,897
Int. Cl.² B01F *17/02*
U.S. Cl. 252—353 **5 Claims**

1. A surfactant composition consisting essentially of an aqueous solution of (a) an alkali metal salt, or an ammonium salt, or a magnesium salt of laurylsulfate, or mixtures thereof and (b) a mono-n-butyl ether of ethylene glycol.

4. In a process for applying a back-sizing and optionally a scrim to a textile article wherein an alkali metal salt, an ammonium salt or a magnesium salt of laurylsulfate is mixed with a latex back-sizing composition, the resulting mixture is frothed, applied to the textile article, and dried, the improvement of adding a mono-n-butyl ether of ethylene glycol before said mixture is frothed.

4,018,700
CHROMATED ALKALINE EARTH SALTS OF BIS(S-DIPHENYLGUANIDINIUM BENZENEPHOSPHONATE) FOR THE CORROSION-INHIBITION OF ALUMINUM AND FERROUS ALLOYS

Eli Simon, 7175 Little Harbor Drive, Huntington Beach, Calif. 92648

Filed Mar. 17, 1976, Ser. No. 667,600
Int. Cl.² C23F *11/00*
U.S. Cl. 252—389 A **3 Claims**

1. An inhibitor for retarding the corrosion of aluminum and ferrous alloys prepared by a three-stage sequential series of reactions conducted in aqueous solutions, the first stage comprising an addition reaction between 1-mol of s-diphenylguanidine and 1-mol of benzenephosphonic acid, the second stage the condensation reaction between 2-moles of the first stage addition-product salt and 1-mol of an a metal oxide selected from calcium, zinc, and strontium, and the third stage the chromating reaction between 1-mol of the second stage metal oxide condensation product and 2-moles of chromium trioxide.

4,018,701

PHOSPHOROUS ACID AND ZINC CORROSION INHIBITING COMPOSITIONS AND METHODS FOR USING SAME

Paul Hotchkiss Ralston, and Bennett Patsy Boffardi, both of Bethel Park, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Filed July 31, 1975, Ser. No. 600,676

Int. Cl.² C09K *3/00;* **C23F** *11/00*

U.S. Cl. 252—389 A **11 Claims**

1. A composition useful for inhibiting the corrosion of metals in a water system comprising phosphorous acid and zinc

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4,018,702

CORROSION INHIBITION WITH AMINE ADDUCTS OF MALEIC ANHYDRIDE POLYMERS

Bennett P. Boffardi, Bethel Park, Pa.; Michael M. Cook, Boxford, Mass., and Paul H. Ralston, Bethel Park, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

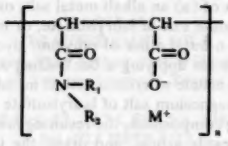
Division of Ser. No. 450,029, March 11, 1974, Pat. No. 3,965,027. This application Feb. 12, 1976, Ser. No. 657,502

Int. Cl.² C23F *11/14, 11/18*

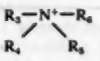
U.S. Cl. 252—389 R **19 Claims**

1. A composition useful for inhibiting the corrosion of metallic surfaces of aqueous systems, comprising zinc and a polymer, wherein the polymer and zinc components are present in a ratio of from about 1 to 5 to about 50 to 1, respectively, said polymer being selected from the group consisting of:

a. polymers having recurring units of the formula:



wherein M^+ may be H^+, alkali metal cation, or quaternary ammonium cation of the formula:

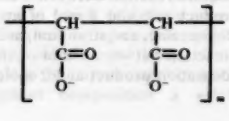


wherein for all of the above formulas, R_1, R_2, R_3, R_4, R_5, and R_6 are each independently selected from the group consisting of hydrogen, alkyl of from one to ten carbon atoms, and substituted alkyl of from one to ten carbon atoms, where the substituent is hydroxyl, carboxyl, and alkali metal and ammonium carboxylate; and

wherein n is an integer of from 2 to 100 such that the polymer has a weight average molecular weight of from about 200 to about 10,000; and

wherein for the polymer component of the composition, the molecular ratio of amine to maleic anhydride is from about 0.1 to about 2.0; and

b. polymers having recurring units of the formula:



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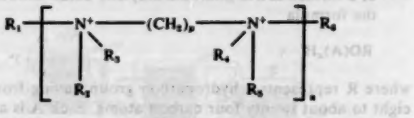


wherein R_1, R_2, R_3, R_4, R_5, and R_6 have the same meaning as above;

wherein p is an integer of from 1 to 6;

wherein m is an integer of from 2 to 100; and

wherein n is an integer of from 2 to about 100 such that the polymer has a weight average molecular weight of from about 200 to about 10,000, provided that, for n not equal to m, the lesser of m or n is multiplied by a factor such that $n=m$; and

wherein for the polymer component of the composition, the molecular ratio of amine to maleic anhydride is from about 0.1 to about 2.0.

4,018,703

CORROSION INHIBITORS

Mervyn Edward Dennant Turner, Billingham, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Sept. 29, 1975, Ser. No. 617,528

Claims priority, application United Kingdom, Oct. 14, 1974, 44394/74

Int. Cl.² C23F *11/00, 15/00*

U.S. Cl. 252—394 **7 Claims**

1. A method of inhibiting the corrosion of steel which in use is contacted with a sulphuric acid or oleum medium which corrodes said steel which comprises maintaining in the medium contacting said steel an amount of a compound selected from the group consisting of dinitrosalicylic acid, nitrophthalic acid, monitroterephthalic acid and dinitroterephthalic acid effective to inhibit corrosion of the steel.

4,018,704

METHOD FOR DESORPTION OF METHYL BROMIDE

Morimasa Kuragano, Yokohama, Japan, assignor to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Nov. 10, 1975, Ser. No. 630,748

Claims priority, application Japan, Nov. 14, 1974, 49-130499

Int. Cl.² B01D *15/06;* **C07C** *21/14*

U.S. Cl. 252—411 R **7 Claims**

1. A method for the desorption of methyl bromide contained on active carbon adsorbent, which comprises the step of contacting an organic solvent vapor which is inert to but desorbs methyl bromide and is selected from the group consisting of lower aliphatic alcohols and chlorinated methane derivations, with the active carbon at a temperature of from about 60° C to about 130° C.

4,018,705

REACTIVATION OF A SPENT LIQUID PHTHALOCYANINE CATALYTIC COMPOSITE

David H. J. Carlson, Park Ridge, and Peter Urban, Northbrook, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

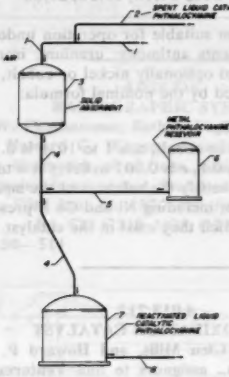
Filed May 19, 1975, Ser. No. 578,971

Int. Cl.² B01J *31/40;* **C10G** *19/02, 19/08*

U.S. Cl. 252—411 R **13 Claims**

1. The method of reactivating a spent liquid phthalocyanine catalyst comprising a phthalocyanine of a metal selected from the group consisting of cobalt, vanadium, iron, copper, nickel and chromium dispersed in a liquid hydroxide of a metal selected from the group consisting of sodium, potassium, calcium, rubidium, strontium, cesium, barium, francium, lith-

ium and beryllium, said catalyst having been deactivated during treatment of hydrocarbons wherein mercaptans are oxidized to disulfides, which process comprises percolating said liquid phthalocyanine catalyst through a bed of solid absorbent selected from the group consisting of activated charcoal and gamma alumina at a temperature of from about



0° C. to about 300° C. and a pressure of from about 1 atmosphere to about 100 atmospheres at a liquid hourly space velocity of from about 0.5 to about 10, thereafter adding to said liquid catalyst a solid phthalocyanine of a metal selected from the group consisting of cobalt, vanadium, iron, copper, nickel and chromium, and recovering the resultant reactivated phthalocyanine catalyst.

4,018,706

CATALYSTS FOR PURIFYING EXHAUST AND WASTE GASES

Akira Inoue, Minoo; Koshi Horie, Suita; Koichi Saito, Ohyamazaki; Yukio Aoki, Suita; Tetsuji Ono, Amagasaki, and Takashi Ohara, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed July 20, 1976, Ser. No. 707,086

Claims priority, application Japan, July 21, 1975, 50-88433; Mar. 1, 1976, 51-21186

Int. Cl.² B01J *31/26, 27/14, 8/02;* **C01B** *25/26*

U.S. Cl. 252—430 **7 Claims**

1. A catalyst for purifying exhaust and waste gases comprising

A. a support substrate comprising 2 to 100% by weight of an oxide complex of titanium and phosphorus containing titanium and phosphorus in such a proportion that the molar ratio of TiO_2 to P_2O_5 is from 5.0 to 0.5 and 98 to 0% by weight of aluminum oxide, and

B. supported on said substrate as a catalytic substance, 2 to 300 parts by weight, calculated as metal oxide per 100 parts by weight of the support substrate (A), of at least one heavy metal selected from the group consisting of Ni, Cu, Cr, Fe, Co, Mn, Bi, V, W, Mo, Sn, Zn, Zr, Pb, Sb, Ti, Ta, Cd and Nb, or 0.01 to 1.0 parts by weight, calculated as metal per 100 parts by weight of the support substrate (A), of at least one noble metal selected from the group consisting of Pt, Pd, Rh, Ir, Os and Ru.

4,018,707

TRANSITION METAL COMPOSITIONS

Ronald John Wyatt, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 62,185, Aug. 7, 1970, abandoned. This application July 16, 1974, Ser. No. 488,939

Claims priority, application United Kingdom, Aug. 13, 1969, 40417/69

Int. Cl.² C08F *4/02, 4/76, 4/78*

U.S. Cl. 252—430 **11 Claims**

1. A transition metal composition, useful as an initiator for the polymerization of olefins, which is the product obtained by mixing together under dry and oxygen-free conditions a transition metal complex of the general formula

$$R_mMX_p$$

with a substantially inert inorganic matrix material having a plurality of —OH groups attached to the surface of the matrix material, the hydrogen atoms of the —OH groups being capable of acting as proton sources, said matrix material being free from adsorbed water, wherein M is a transition metal of Groups IVA to VIA of the Periodic Table of the Elements, R is a hydrocarbon group or $-CH_2Y$ where Y is $-Z(R^1)_3$ where Z is silicon, germanium, tin or lead and R^1 is hydrogen or hydrocarbon, X is a halogen and *m* and *p* are integers, *m* having a value from 2 to the highest valency of the metal M and *p* having a value from 0 to 2 less than the valency of the metal M, except when M is a metal of Group VIA when *p* is 0.

4,018,708

TIN-TITANIUM COMPLEXES AS ESTERIFICATION/TRANSESTERIFICATION CATALYSTS

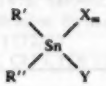
Herwart C. Vogt, Grosse Ile; Manher Parekh, Woodhaven, and John T. Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 29, 1975, Ser. No. 644,358

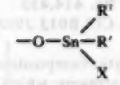
Int. Cl.² B01J *31/12*

U.S. Cl. 252—431 C **8 Claims**

1. The method of preparing a complex which comprises mixing a quadrivalent organotitanium compound having the formula $Ti(OR)_4$ wherein R is a radical selected from the group consisting of an aliphatic radical having from 1 to 18 carbon atoms, an alicyclic radical having between 1 and 3 rings, between 5 and 6 carbon atoms per ring and between 5 and 18 carbon atoms per molecule, and an aromatic radical having between 1 and 3 rings and between 6 and 18 carbon atoms per molecule with a quadrivalent organotin compound having the formula:



wherein R′ and R″ are individually alkyl, aryl, alicyclic groups, containing 1 to 18 carbon atoms and may be the same or different, X is an alkyl, aryl, alicyclic, heterocyclic, alkoxyl or carboxyl group having 1 to 18 carbon atoms, Y is an alkoxyl or carboxyl group each containing from 1 to 18 carbon atoms, an oxy or ether group or a group represented by the following formula:



provided that when Y is this group, X is an alkyl group, m is equal to 1 except when Y is an oxy group then *m* is equal to

0, in a mole ratio from about 1:1 to about 1:4 titanium to tin compound and stirring the mixture until substantially all the titanium compound has reacted with the tin compound to form said complex.

4,018,709

CATALYST FOR PREPARING MALEIC ANHYDRIDE FROM C_4 HYDROCARBONS

Bruno J. Barone, and Ralph O. Kerr, both of Houston, Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Mar. 17, 1975, Ser. No. 558,738

Int. Cl.² B01J *27/14*

U.S. Cl. 252—435 **6 Claims**

1. An improved vanadium - phosphorus-oxygen catalyst complex for the oxidation of n-C_4 hydrocarbons to produce maleic anhydride consisting essentially of principal active components in the atom ratios vanadium 1: phosphorus 0.90 to 1.3: Me 0.005 to 0.4 wherein Me is a mixture of B and elements selected from group consisting of Zn, Cr, U, W, Cd, Ni and Si.

4,018,710

REDUCTION CATALYSTS AND PROCESSES FOR REDUCTION OF NITROGEN OXIDES

Masakazu Oshimura, Ibaraki; Akira Kawakami, Takatsuki; Hiroaki Hosoda, Moriguchi; Osamu Okamoto, Ibaraki; Osamu Watanabe, Suita; Shinichi Fujii, Osaka; Satoru Yamaguchi, Suita; Noboru Odani, Ibaraki, and Yoshizo Koori, Osaka, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Aug. 27, 1974, Ser. No. 501,078

Claims priority, application Japan, Aug. 27, 1973, 48-95854

Int. Cl.² B01J *27/04, 23/10*

U.S. Cl. 252—439 **9 Claims**

1. A catalyst for reducing the oxides of nitrogen consisting essentially of a composition of nickel oxide, cerium oxide and rhodium, the molar ratio of the CeO_2 to the NiO being within the range of from about 0.05 to 1 to about 2.5 to 1 and the amount of the Rh being from about 7.5 to about 25 parts by weight to 100 parts by weight of the CeO_2 and the NiO.

4,018,711

CATALYTIC COMPOSITION

Ralph J. Bertolacini, Chesterton, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 167,429, July 29, 1971, abandoned, which is a division of Ser. No. 873,305, Nov. 3, 1969, Pat. No. 3,679,575. This application Nov. 9, 1973, Ser. No. 414,435

Int. Cl.² B01J *29/06*

U.S. Cl. 252—455 Z **9 Claims**

1. An improved catalytic composition for the reforming of petroleum hydrocarbon streams, which catalytic composition consists of a Group VIII noble metal, mordenite, and an alumina, said mordenite having a silica-to-alumina ratio that is at least 19:1 but less than 45:1.

4,018,712

OXIDATION/AMMOXIDATION CATALYST

Tao P. Li, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 429,010, Dec. 27, 1973, abandoned. This application May 19, 1975, Ser. No. 578,586

Int. Cl.² B01J *29/16, 29/26, 29/00*

U.S. Cl. 252—456 **9 Claims**

1. A catalyst system suitable for operation under pressure comprising the elements antimony, uranium, iron, bismuth and molybdenum, and optionally nickel or cobalt, in an oxidized state represented by the nominal formula:

$$Sb_aU_bFe_cBi_dMo_eMe_fO_g$$

wherein Me is nickel or cobalt, a is 1 to 10, b is 0.1 to 5, c is 0.1 to 5, d is 0.001 to 0.1, e is 0.001 to 0.1, f is 0 to 0.1 and g is a number taken to satisfy the valences of the quantities of Sb, U, Fe, Bi and Mo, including Ni and Co if present, in the oxidation states in which they exist in the catalyst.

4,018,713

AMMOXIDATION CATALYST

Ronald D. Bushick, Glen Mills, and Howard P. Angstadt, Media, both of Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Division of Ser. No. 568,356, April 15, 1975, Pat. No. 3,959,336, which is a continuation-in-part of Ser. No. 504,939, Sept. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 404,964, Oct. 10, 1973, abandoned. This application Jan. 27, 1976, Ser. No. 652,933

Int. Cl.² B01J *21/04, 21/16, 23/22, 23/04*

U.S. Cl. 252—464 **5 Claims**

1. A catalyst composition consisting essentially of from about 1% to 20% by weight of the total catalyst of an alkali metal vanadium bronze and from about 0.25% to about 10% by weight of a niobium oxide on a support consisting essentially of α-alumina.

4,018,714

HYDRODESULFURIZATION CATALYST AND PROCESS FOR PRODUCING THE SAME

Geoffrey R. Wilson, Westlake Village, and Masami Kayamoto, Whittier, both of Calif., assignors to Filtrol Corporation, Los Angeles, Calif.

Filed Dec. 3, 1975, Ser. No. 637,363

Int. Cl.² B01J *21/04, 21/06, 23/84, 23/88*

U.S. Cl. 252—465 **19 Claims**

1. A catalyst consisting essentially of a substrate containing from about 5 to about 40% by weight of the total weight of Group VIII metal oxide and an oxide of a metal selected from the group consisting of molybdenum and tungsten, expressed as the metal, with the atomic weight ratio of Group VIII metal to molybdenum or tungsten being from about 1:0.3 to about 1:2.5 supported on a non-zeolitic refractory oxide carrier, and promoted with from about 1 to about 10% by weight of an oxide of a Group IV-B metal expressed as metal, all based on the weight of metal element plus the weight of said pellet substrate, said catalyst being in pellet form and having an Abrasion Index of less than about 10%.

4,018,715

GROUND ELECTRODE BACKFILL COMPOSITION

Joe F. Tatum, P.O. Box 1089, Hattiesburg, Miss. 39401

Filed June 29, 1976, Ser. No. 700,983

Int. Cl.² H01B *1/06*

U.S. Cl. 252—510 **8 Claims**

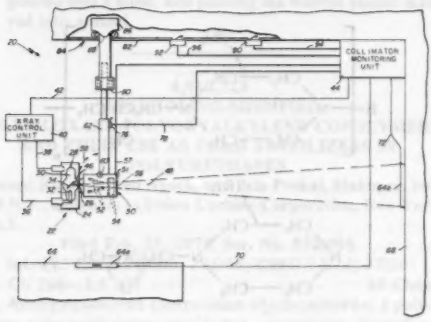
2. A backfill material for earth anode beds comprising a mixture of the following components:

Components	Range in Per Cent by Weight
Particulate calcined fluid petroleum coke	97.50 – 98.45
Powdered graphite	1.50 – 2.40
Surfactant	.05 – .15

4,018,716
RADIOGRAPHIC SYSTEM

Thomas W. Fitzsimmons, Bethel; Vincent Berluti, Jr., West Haven; Howard G. Wagner, Stamford, and Jonathan S. Shapiro, Greenwich, all of Conn., assignors to The Machlett Laboratories, Incorporated, Stamford, Conn.

Filed June 16, 1975, Ser. No. 587,447
Int. Cl.² G21F *5/04*; G21K *1/04*
U.S. Cl. 250—511 **8 Claims**



1. A radiographic system comprising:

means for directing an X-ray beam from a source through an adjustable shutter aperture in an aligned collimator and onto an image receptor located at a preselected distance from the source; and

automatic means connected to the source, the collimator, and the image receptor for ensuring that the cross-sectional size of the X-ray beam conforms to the size of the image receptor at the selected distance from the source, the automatic means including

memory means disposed to receive electrical signals indicative of operating parameters and programmed to produce a desired output signal upon receipt of a prescribed series of operating parameters;

receptor detector means disposed for engagement with the image receptor and electrically connected to the memory means for producing electrical signals indicative of the image receptor in position to receive the X-ray beam; and

orientation detector means connected to the collimator and electrically connected to the memory means for producing electrical signals indicative of the orientation of the shutter aperture with respect to the image receptor.

4,018,717
ARC SUPPRESSION IN A CATHODE RAY TUBE

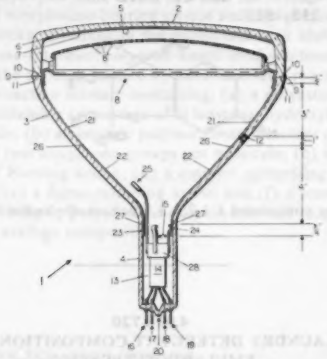
Josef Francel, Toledo, and Galen D. Lemke, Elmore, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Sept. 29, 1975, Ser. No. 617,566
Int. Cl.² H01B *1/08*
U.S. Cl. 252—513 **8 Claims**

1. An electrically conductive composition for use on interior surfaces of a funnel portion and neck portion of a cathode ray tube in order to substantially suppress internal arcing during operation of said tube, said composition consisting essentially of a substantially homogeneous mixture of:

a. about 10–30 percent by weight of iron having a particle size of about 0.1–20 microns; and

b. about 90–70 percent by weight of a lead borate or lead zinc borate glass frit having a particle size such that about 100% of the glass frit particles pass a 100 mesh U.S. Sieve Series screen;



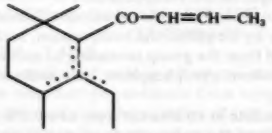
said composition being capable of being fired on said funnel and neck portions at a temperature of about 400°–450° C. to form layers each layer having a thickness of about 18–70 microns and an electrical resistivity of about 1 ohm to about 2000 ohms; said composition being capable of substantially suppressing arcing within said tube during operation of said tube at a voltage up to about 40,000 volts.

4,018,718
2-ETHYL-3,6,6-TRIMETHYL-1-CROTONYL-2-CYCLOHEXENE-TYPE COMPOUNDS AND PERFUME COMPOSITIONS

Paul Albert Ochsner, Geneva, and Hanspeter Schenk, Zumikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 567,891, April 14, 1975. This application Feb. 13, 1976, Ser. No. 657,815
Claims priority, application Switzerland, Apr. 19, 1974, 5436/74; Feb. 3, 1975, 1772/75
Int. Cl.² C11B *9/00*
U.S. Cl. 252—522 **6 Claims**

1. Compounds of the general formula



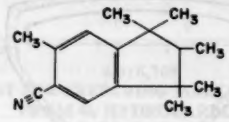
(I)

wherein one of the three lines indicated by dots represents an additional bond.

4,018,719
SYNTHETIC MUSK PERFUME COMPOUND 1,1,2,3,3,5-HEXAMETHYLINDAN-6-NITRILE

Robert S. De Simone, Middletown, N.Y., assignor to Polak's Frutal Works, Inc., Middletown, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,782
Int. Cl.² C11B 9/00
U.S. Cl. 252—522 3 Claims

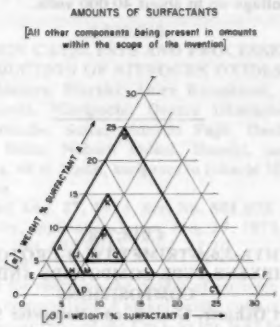


1. The compound 1,1,2,3,3,5-hexamethylindan-6-nitrile.

4,018,720
LAUNDRY DETERGENT COMPOSITIONS IN EMULSION/SUSPENSION

Stephen Price Lengyel, Bridgewater, N.J., and Toshiyuki Ishige, Hirakata, Japan, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed July 14, 1975, Ser. No. 595,817
Int. Cl.² C11D 1/29, 1/37, 3/065, 17/08
U.S. Cl. 252—534 28 Claims


AMOUNTS OF SURFACTANTS
[All other components being present in amounts within the scope of the invention]
[a] = WEIGHT % SURFACTANT A
[b] = WEIGHT % SURFACTANT B

1. A liquid detergent composition which comprises:

a. surfactant in an amount from about 7% to about 25% by weight of the composition, said surfactant consisting of:

i. Surfactant A selected from the group consisting of sodium alkyl sulfate $ROSO_3Na$ and sodium alkyl ether sulfate $R(OC_2H_4)_n\ OSO_3Na$, where R is an alkyl chain having from about 12 to about 20 carbon atoms and where *n* has an average value from about 1 to about 12, or mixtures thereof; and

ii. Surfactant B consisting of sodium alkyl benzene sulfonate $R'\phi SO_3Na$ where R′ is a branched alkyl chain having from about 9 to about 15 carbon atoms;

wherein the amount of Surfactant A is between about 3% and about 25% by weight of the composition;

b. inorganic phosphate builder in an amount from about 6% to about 25% by weight of the composition, said builder being selected from the group consisting of sodium orthophosphate, sodium pyrophosphate, and sodium tripolyphosphate;

c. alkali metal sulfate in an amount from about 3% to about 20% by weight of the composition as stabilizing electrolyte; and

d. water in an amount from about 40% to about 75% of the composition.

4,018,721
CROSS-LINKED, WATER INSOLUBLE POLY(N-GLYCIDYL-PIPERAZINE)

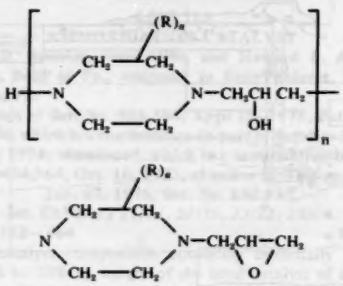
Robert James Cotter, Bernardsville; Michael John Keogh, Somerville, and William Donald Heitz, Flagtown, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 531,398, Dec. 10, 1974, abandoned, which is a division of Ser. No. 489,126, July 17, 1974, Pat. No. 3,876,395, which is a continuation-in-part of Ser. No. 448,999, March 7, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,209
Int. Cl.² C08G 65/22
U.S. Cl. 260—2 A 6 Claims

1. A crosslinked, water-insoluble homopolymer of N-glycidylpiperazine.

2. Method of preparing porous particles of a crosslinked, water-insoluble poly(N-glycidylpiperazine) which comprises:

a. polymerizing an aqueous solution of an oligomer having the structure:



wherein each R is a lower alkyl group having up to about 8 carbon atoms, *a* is an integer having values of 0 to 4 and *n* is an integer having values of about 2 to about 20, with about 0 to 300 parts of a water-soluble filler per 100 parts of oligomer and an azeotropic agent until polymeric beads are formed;

b. removing the water by azeotropic distillation;

c. recovering the polymeric beads; and

d. extracting the polymeric beads with water until the water extract contains no water-soluble filler.

4,018,722
RECLAIMED PLASTIC MATERIAL

Carl Baker, Wickenburg, Ariz., assignor to Elizabeth I. Bellack, Wickenburg, Ariz., a part interest

Continuation-in-part of Ser. No. 556,696, March 10, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,314
Int. Cl.² C08J 11/04
U.S. Cl. 260—2.3 3 Claims

1. A method of reclaiming nuisance plastic material comprising the steps of:

heating a quantity of animal fat in a container,

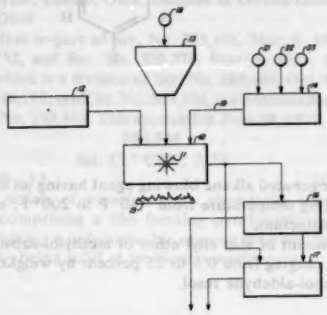
adding shredded thermoplastic nuisance material to said heating animal fat in sufficient quantity such that the animal fat forms a lubricant and a surface covering for the heating plastic material,

adding a sufficient quantity of silica sand containing iron and manganese as impurities and sodium chloride to provide a smooth and glossy finish to the heating plastic material,

adding a sufficient quantity of sodium hydrogen carbonate to retard flaming of the heating plastic material,

agitating the heating plastic material to cause uniform heating thereof,

heating the plastic material until the heated plastic material reaches a molten slurry condition so that it may be



poured into a mold, and pouring the molten plastic material into a mold.

4,018,723
MORPHOLINO-MODIFIED POLYSILOXANE-POLYOXYALKYLENE COPOLYMERS AND THEIR USE AS FOAM STABILIZERS IN POLYURETHANES

Bernard Kanner, West Nyack, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 25, 1975, Ser. No. 552,996

Int. Cl.² C07D *295/04, 295/08;* **C08G** *18/14, 77/26*

U.S. Cl. 260—2.5 AH **40 Claims**

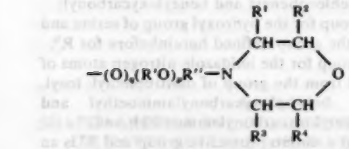
1. An organosilicone composition which comprises a polysiloxane-polyoxyalkylene copolymer containing monofunctional siloxy units and difunctional siloxy units, an average of between about 2 and about 30 silicon-bonded polyoxyalkylene blocks for every two moles of monofunctional units, and an average of from about 2 to about 100 silicon-bonded morpholino-bearing groups for every two moles of monofunctional units, wherein:

i. said polyoxyalkylene blocks have the average composition,

$$-(R^{\circ})_r-(OC_aH_{2a})_b-OG$$

where r is zero or one, R° comprises a bivalent alkylene group a carbon atom of which is bonded to silicon, $-(OC_aH_{2a})_b-$ is a polyoxyalkylene chain where a has a value from 2 to 4 and b has an average value from about 3 to about 100, and G is an organic cap;

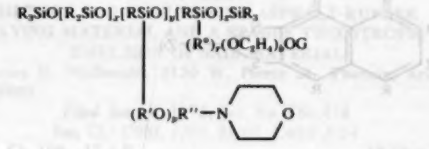
ii. said morpholino-bearing groups have the formula,



wherein p is zero or has an average value from about one to about four, q is zero or one provided q is one when p has a value of more than one, R′ is bivalent alkylene having from two to four carbon atoms, R″ is bivalent alkylene having from two to six carbon atoms, and R^1, R^2, R^3 and R^4 are independently hydrogen or alkyl of one to four carbon atoms; and

iii. the monofunctional units of the copolymer have at least two alkyls of one to ten carbon atoms bonded to the respective silicon atoms thereof and the difunctional units have at least one alkyl of one to ten carbon atoms bonded to the respective silicon atoms thereof, the remaining organic group bonded to silicon of the respective monofunctional and difunctional siloxy units being alkyl of one to ten carbon atoms, said morpholino-bearing group or said polyoxyalkylene block, provided the average number of said morpholino-bearing groups and said polyoxyalkylene blocks contained in the copolymer is as aforesaid.

40. A flame-retardant polyester-based urethane foam which comprises the product formed by simultaneously reacting and foaming a reaction mixture containing: (a) a polyester polyol reactant containing an average of at least two hydroxyl groups per molecule; (b) an organic polyisocyanate reactant containing at least two isocyanato groups per molecule; (c) water as a source of blowing action; (d) a catalyst comprising a tertiary-amine; (e) a flame-retarding agent; and (f) a foam stabilizer comprising a polysiloxane-polyoxyethylene copolymer having the average composition,



wherein: R is alkyl having from one to four carbon atoms; R′ is bivalent alkylene of 2 to 4 carbon atoms; R″ is bivalent alkylene of 2 to 6 carbon atoms; R° comprises a bivalent alkylene group of from 2 to 6 carbon atoms a carbon atom of which is bonded to silicon; G is an organic cap; r is zero or one; p is zero or one; b has an average value from about 3 to about 30; x is zero or a positive number having an average value up to about 20, y has an average value from about 2 to about 20, and z has an average value from about 2 to about 30, provided the average weight of said copolymer attributable to $-(R^{\circ})_r(OC_2H_4)_bOG$ is from about 50 to about 85 weight percent.

4,018,724
FLAME RETARDANT FLEXIBLE URETHANE FOAMS

David Stanley Cobbledick, Kent, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

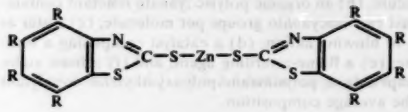
Continuation-in-part of Ser. No. 632,940, Nov. 18, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,641

Int. Cl.² C08J *9/00*

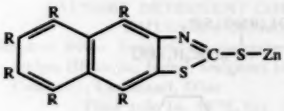
U.S. Cl. 260—2.5 AB **10 Claims**

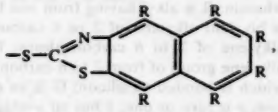
1. In the method of making a fluid or semiflexible low density, flame retardant polyurethane foam using the one-shot or prepolymer process by the reaction of (A) a polyetherpolyol having from two to four hydroxyl groups and having a molecular weight of from about 1,000 to 10,000, (B) an organic polyisocyanate and (C) a blowing agent comprising water in admixture with (D) a surfactant, (E) a catalyst, (F) from

about 1 to 50 parts by weight per 100 parts by weight of said polyol of a finely divided, solid chlorine-containing polymeric resin having an intrinsic viscosity of from about 0.25 to 2.5, (G) finely divided zinc oxide in an amount of from about 0.1 to 10 parts by weight per 100 parts by weight of said polyol, and (H) finely divided antimony trioxide in an amount of from about 0.5 to 15 parts by weight per 100 parts by weight of said polyol, the improvement comprising incorporating in said formulation prior to foaming a finely divided salt selected from the group consisting of



and





the R's being the same or different, where R is —R', —OR', —halogen, —hydrogen, or a —nitro group, R' being a C_1 to C_{10} alkyl, cycloalkyl, aralkyl, alkaryl or aryl group, said zinc salt being used in an amount of from about 0.05 to 5.00 parts by weight per 100 parts by weight of total polyol.

4,018,725

PHENOLIC FOAM PRODUCTS AND METHOD OF MAKING THE SAME

John F. Hadley, Bradford Woods, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Aug. 9, 1976, Ser. No. 712,652

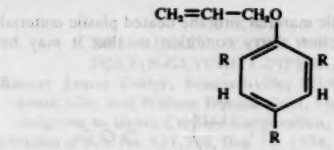
Int. Cl.² C08J 9/14

U.S. Cl. 260—2.5 F **2 Claims**

1. A composition suitable for forming into a phenol-aldehyde foam product comprising:

1. phenol-aldehyde resol;

2. allyl ether of methylol-substituted phenol



;

3. halogenated alkane blowing agent having an atmospheric boiling temperature from −40° F to 200° F; and

4. a surfactant;

the amount of said allyl ether of methylol-substituted phenol ranging from 0.5 to 25 percent by weight of the said phenol-aldehyde resol.

4,018,726

[D-PHE⁷]-LH-RH AND INTERMEDIATES THEREFOR

Andrew Victor Schally, 2500 Whitney Place, Apt. 319, Metairie, La. 70002, and David Howard Coy, 4319 Perrier St., New Orleans, La.

Filed June 12, 1975, Ser. No. 586,436

Int. Cl.² C07C 103/52; C08H 1/00

U.S. Cl. 260—8 **7 Claims**

5. A compound selected from the group consisting of R^5-(pyro)-Glu-His-(N^{1m}-R^5)-Trp-Ser(R^4)-Tyr(R^3)-D-Phe-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-His(N^{1m}-R^5)-Trp-Ser(R^4)-Tyr-(R^3)-D-Phe-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-Trp-Ser(R^4)-Tyr-(R^3)-D-Phe-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-Ser(R^4)-Tyr(R^3)-D-Phe-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-Tyr(R^3)-D-Phe-Leu-Arg-(N^G-R^2)-Pro-Gly-A, and R^7-D-Phe-Leu-Arg(N^G-R^2)-Pro-Gly-A, in which

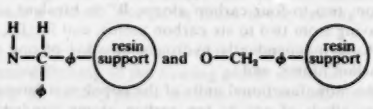
R^2 is a protective group for the N^2, N^w, and N^{w1} nitrogen atoms of arginine selected from the group consisting of tosyl, nitro, benzyloxycarbonyl and adamantyloxycarbonyl;

R^3 is a protective group for the hydroxyl of tyrosine selected from the group consisting of 2-bromo-benzyloxycarbonyl, benzyl, acetyl, tosyl, benzoyl, t-butyl, tetrahydropyran-2-yl, trityl, 2,4-dichlorobenzyl and benzyloxycarbonyl;

R^4 is a protective group for the hydroxyl group of serine and is selected from the group defined hereinbefore for R^2;

R^5 is a protective group for the imidazole nitrogen atoms of histidine selected from the group of dinitrophenyl, tosyl, 2,2,2-trifluoro-1 -benzoyloxycarbonylaminoethyl and 2,2,2-trifluoro-t-butyloxycarbonylaminoethyl; and

R^6 is hydrogen or an α-amino protective group and R^7 is an α-amino protective group, and A is selected from the class consisting of:



4,018,727

CHEMICALLY CONVERTIBLE TAPE WITH IN SITU SYNTHESIZED POLYMER

Lynn J. Taylor, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 339,166, Mar. 8, 1973, Pat. No. 3,901,752, and Ser. No. 339,278, Mar. 8, 1973, Pat. No. 3,900,682, which is a division of Ser. No. 189,449, Oct. 14, 1971, Pat. No. 3,816,162, said Ser. No. 339,166, is a continuation-in-part of said Ser. No. 189,449. This application June 19, 1975, Ser. No. 588,546

Int. Cl.² C08L 1/28

U.S. Cl. 260—13 10 Claims

1. As an article of manufacture, a chemically convertible, solid tape comprising a film-forming pyrolyzable polymeric binder containing a polymerizable organic member, said polymeric binder being solid at ambient temperatures.

4,018,728

PRINTING INK

John Garrick Priest, London, England, assignor to Johnson Matthey & Co., Limited, London, England

Continuation-in-part of Ser. No. 334,718, Feb. 22, 1973, abandoned. This application Aug. 20, 1974, Ser. No. 499,043

Int. Cl.² C08K 5/10, 5/42; C08L 1/18, 93/04

U.S. Cl. 260—17 R 16 Claims

1. A printing ink formulation for producing a transferable layer comprising a material having pigmentary or electrical properties, which material is an element or a compound comprising a metal selected from the group consisting of transition metals and metals of the sub-groups IIIA, IVA, VA and VIA of the periodic classification, a hot melt adhesive selected from the group consisting of acrylic polymers and copolymers, a solid phase plasticiser and a solvent, the solvent being selected from the group consisting of aliphatic hydrocarbon solvents and mixtures of aliphatic and aromatic hydrocarbon solvents containing up to 40 wt.% of aromatic solvent, and the plasticiser being one which has a melting point falling within the range of 60° to 90° C and which is substantially completely insoluble in aliphatic hydrocarbon solvents and only partially soluble in aromatic hydrocarbon solvents.

4,018,729

SHAPED ARTICLE FOR CONDITIONING HAIR A BLEND OF WATER-SOLUBLE AND WATER-INSOLUBLE POLYMERS WITH INTERPENETRATING NETWORKS

Joseph A. Faucher, Pleasantville, and Meyer Robert Rosen, Spring Valley, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 510,998, Oct. 1, 1974, Pat. No. 3,992,336. This application Nov. 10, 1975, Ser. No. 630,404

Int. Cl.² A45D 24/00; A61K 7/06; C08L 1/28

U.S. Cl. 260—17 R 28 Claims

1. Shaped hair treating article which comprises a blend of a normally solid, water soluble organic polymer selected from the group consisting of ethylene oxide resins, polyvinyl-pyrrolidone, hydroxypropyl cellulose, a cationic polyacrylic acid and polyvinyl methyl ether, in combination with a normally solid, water insoluble organic polymer, selected from the group consisting of polystyrene, poly(epsilon-caprolactone), polyvinyl chloride, a copolymer of vinyl chloride and vinyl acetate, a copolymer of vinyl chloride and ethylene, polypropylene and polybutylene, in which said polymers are present in an interpenetrating network in a ratio of 99:1 to 1.99.

4,018,730

METHOD FOR EMULSIFYING ASPHALT-RUBBER PAVING MATERIAL AND A STABLE THIXOTROPIC EMULSION OF SAID MATERIAL

Charles H. McDonald, 3130 W. Pierce St., Phoenix, Ariz. 85009

Filed June 6, 1975, Ser. No. 584,478

Int. Cl.² C08L 1/00, 95/00; C09D 3/24

U.S. Cl. 260—17.4 R 12 Claims

1. A method for emulsifying a asphalt-rubber pavement material into a stable, thixotropic emulsion capable of flowing as a liquid upon agitation comprising the steps of:

a. heating a mixture of about 2 to about 5 parts of paving grade asphalt with a penetration range of 10 through 300 and about 1 part of particulate non-oil resistant asphalt soluble rubber selected from the group consisting of whole tire rubber, reclaimed rubber and partially devulcanized reclaimed rubber to a temperature within the range of about 350° F to about 500° F forming a jellied reaction product,

b. admixing said jellied reaction product with a asphalt-rubber soap consisting essentially of water, an anionic water soluble emulsifying agent, a thickener, and a halide of an alkali metal or an alkaline earth metal.

4,018,731

HIGH IMPACT POLYAMIDES

Willard M. Sims, Leominster, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.

Filed June 12, 1975, Ser. No. 586,332

Int. Cl.² C08L 91/00

U.S. Cl. 260—23.7 N 9 Claims

1. A polyamide composition comprising the interpolymerization product of a polyamide-forming monomer or mixture of monomers selected from the group consisting of:

a. a lactam

b. an amino carboxylic acid

c. a mixture of a divalent carboxylic acid and a divalent diamine

d. a mixture of at least two of *a*, *b* and *c*, and from about 1 to 20% by weight of said polyamide composition of an approximately equi molar mixture of a diolefin polymer having an average molecular weight within the range of about 1,000 to 20,000 and a dimerized fat acid or fat acid derivative having from 16 to 48 carbon atoms, each of said diolefin polymer and fat acid or fat acid derivative having amide-forming functional groups at each terminal position in the molecular chain.

4,018,732

ADHESIVE COMPOSITION

Pallavoor R. Lakshmanan, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jan. 2, 1976, Ser. No. 646,061

Int. Cl.² C08L *93/00*

U.S. Cl. 260—27 R **6 Claims**

1. An improved adhesive composition consisting essentially of (1) an aqueous dispersion of a polymeric substance selected from the group consisting of a water-insoluble linear copolymer, and salts thereof, of about two to about four weight percent of an acid selected from the group consisting of itaconic acid, fumaric acid, and the dimer of methacrylic acid, about five to about 25 weight percent of a member selected from the group consisting of methyl methacrylate and acrylonitrile, and the balance of at least one ester of acrylic acid with an alcohol having from one to 18 carbon atoms, the copolymer having a T_1 between about −15° C. and +15° C. and a viscosity average molecular weight between about 50,000 to about 2,000,000, the salt being selected from the group consisting of those of ammonium, alkali metals and those formed with a water-soluble amine, the dispersion containing about 30 to about 55 weight percent of water and at least about 30 weight percent by weight of copolymer, (2) a rosin ester dispersion, and (3) a filler or fillers, said components being present in the following amounts:

	Parts By Weight
Acrylic-Containing Polymer Dispersion	100
Rosin Ester Dispersion	20–150
Filler	25–400

4,018,733

HOT MELT ADHESIVE COMPOSITION COMPRISING AN ACIDIC ETHYLENE POLYMER AND A POLYAMIDE

Eugene Francis Lopez, Sunnyvale; Leon Conrad Glover, Jr., Los Altos, and Bernard John Lyons, Atherton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 291,542, Sept. 25, 1972, abandoned. This application July 29, 1974, Ser. No. 492,722

Int. Cl.² C09J *3/14*

U.S. Cl. 260—27 EV **14 Claims**

1. A hot melt adhesive composition comprising a compatible mixture of: (a) an acidic polymer of ethylene having an acid number ranging from about 3 to about 80 selected from the group consisting of a terpolymer of ethylene, an ethylenically unsaturated mono- or dicarboxylic acid and a vinyl ester of C_1 to C_6 aliphatic carboxylic acid and a copolymer of ethylene and a C_2 to C_{20} aliphatic ester of a mono ethylenically unsaturated mono- or dicarboxylic acid wherein a portion of the carboxylic acid moieties of said mono- or dicarboxylic acid component are not esterified, and (b) a polyamide having an amine number ranging from about 70 to about 400 with a tackifying agent wherein said tackifying agent is present in an amount ranging from about 3 to about 20 parts by weight per 100 parts of (a) and (b) together, components (a) and (b) being present in a relative proportion by weight ranging from about 40:60 to 60:40.

4,018,734

ORGANOSILICON COMPOSITIONS WHICH IMPART NON-STICK PROPERTIES TO CELLULOSIC AND SYNTHETIC MATERIALS

Jean Dumoulin, Sainte Croix-en-Jarez, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed June 6, 1975, Ser. No. 584,353

Claims priority, application France, June 10, 1974, 74.19950

Int. Cl.² C08K *5/00, 5/01, 5/07, 5/10*

U.S. Cl. 260—29.1 SB **6 Claims**

1. An organosilicon coating composition which comprises, by weight:

A. 100 parts of dimethylpolysiloxane polymer selected from the group consisting of

i. an α,ω-dihydroxydimethylpolysiloxane gum with a viscosity of at least about 1 million cPo at 25° C.,

ii. a mixture containing at least about 75% of said gum and at most about 25% of low molecular weight linear or cyclic dimethylpolysiloxane polymer present during the preparation of said gum by polymerisation of dimethylcyclopolysiloxane by means of alkaline or acid catalyst, and

iii. a mixture containing about 60 to 90% of α,ω-dihydroxydimethylpolysiloxane oil with a viscosity from 300 to 900,000 cPo at 25° C., and about 40 to 10% of α,ω-bis-(triorganosiloxy)-dimethylpolysiloxane gum with a viscosity of at least 1 million cPo at 25° C., blocked at its chain ends by units of the formulae: $(CH_3)_3SiO_{0.5}$ and/or $(CH_3)_2(CH_2{=}CH)SiO_{0.5}$,

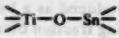
B. 0 to 10 parts of a methylhydrogenopolysiloxane oil of the general formula:

$$(CH_3)_3SiO[Si(CH_3)_2O]_x[SiH(CH_3)O]_ySi(CH_3)_3$$

in which *x* is zero or an integer or non-integral number of at most 30 and *y* represents an integral or non-integral numbers from 5 to 90,

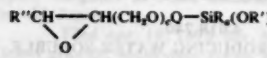
C. 2 to 10 parts of a crosslinking system,

D. 0.5 to 5 parts of a catalyst selected from the group consisting of an organic tin derivative and a polymer possessing

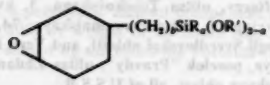


chains,

E. 0.05 to 2 parts of an epoxysilane selected from the group consisting of epoxysilanes of the formula:



and of the formula:



in which R represents an alkyl group with 1 to 4 carbon atoms or a phenyl group, R' represents an alkyl group with 1 to 3 carbon atoms or a methoxyethyl group, R'' represents a hydrogen atom or an alkyl group with 1 to 3 carbon atoms, Q represents an alkylene radical with 1 to 10 carbon atoms, a represents 0 or 1, *b* represents 0 or 2, and *c* represents 0 or 1, and

F. 500 to 2,500 parts of organic solvent selected from the group consisting of a halogenated or non-halogenated alkane and cycloalkane, a halogenated or non-halogenated aromatic hydrocarbon, an aliphatic ketone and an alkyl ester of a monocarboxylic acid, the cross-linking system (C) comprising (1) about 70 to 95% of at least one organosilicon compound possessing at least 3 acyloxy groups bonded to one or more silicon atoms, which is a silane of the formula: $RSi(OCOR'')_3$, a disilane, a disiloxane or a disilylalkane of the formula: $(R'\lambda'COO)_{3-d}R_{d'}$ $Si(X)_fSiR_{d'}(OCOR'')_{3-d}$, in which R and R'' are as defined above, X represents an oxygen atom or the alkylene radical $-(CH_2)_h-$, each of *d* and *d'*, which may be identical or different, represents zero, 1 or 2, the sum $d + d'$ being 2 or 3, *f* represents zero or 1 and *h* represents 2 or 4, and 2) about 5 to 30% of at least one hexaalkoxymethylmelamine, the alkoxy groups each having 1 to 4 carbon atoms.

4,018,735

ANISOTROPIC DOPES OF AROMATIC POLYAMIDES

Yasuo Nakagawa, Kokubunji; Takashi Noma, and Hiroshi Mera, both of Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed July 8, 1975, Ser. No. 594,130

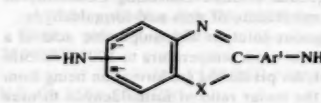
Claims priority, application Japan, July 10, 1974, 49-78163

Int. Cl.² C08K *3/16, 5/20, 5/21, 5/36*

U.S. Cl. 260—29.1 R **13 Claims**

1. An anisotropic dope of an aromatic polyamide, comprising more than 10% by weight of an aromatic polyamide and an organic polar or protonic acid solvent therefore, said aromatic polyamide consisting essentially of 100 mole% of:

A. at least 5 mole% but less than 35 mole%, based on the entire units of the polyamide, of units of formula (1) below



(1)

wherein Ar^1 is a divalent aromatic ring whose chain-extending bonds are coaxial or parallel and is a phenylene, biphenylene, naphthylene or pyridylene, each of which may have a substituent which is a lower alkyl, lower alkoxy, halogen, nitro, or cyano group, X is a member selected from the group consisting of O, S and NH, and the NH group bonded to the benzene ring of the above benzoxazole,, benzothiazole or benzimidazole ring is meta or para to the carbon atom to which X is bonded of said benzene ring;

B. 0 to 45 mole%, based on the entire units of the polyamide, of units of formula (2) below

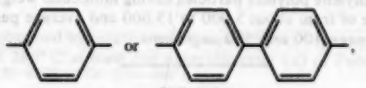
$$-NH-Ar^3-NH- \quad (2)$$

wherein Ar^3 is the same in definition as Ar^1, and is identical to or different from Ar^1;

C. an equimolar amount, based on the total moles of the units of formulae (1) and (2) above, of a structural unit of formula (3) below

$$-CO-Ar^3-CO- \quad (3)$$

wherein Ar^3 is



in which the benzene ring optionally contains a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy, nitro and cyano; and

0 to 90 mole%, based on the entire units of the polyamide, of a structural unit of formula (4) below

$$-NH-Ar^4-CO- \quad (4)$$

wherein Ar^4 is the same in definition as Ar^1, and is identical to or different from Ar^1.

4,018,736

MANUFACTURE OF POLYESTER-IMIDE POWDERS

Wolfgang Fabian, Wilhelmsfeld, and Jenoe Kovacs, Bobenheim-Roxheim, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 8, 1975, Ser. No. 638,958

Claims priority, application Germany, Dec. 20, 1974, 2460472

Int. Cl.² C08G *63/44;* **C08J** *3/12*

U.S. Cl. 260—29.2 N **4 Claims**

1. A process for the manufacture of finely divided polyesterimide powders wherein solutions, of from 5 to 60% strength by weight, of a polyester-imide, optionally together with assistants, in an organic solvent having a freezing point of from +20° to −30° C are cooled to a temperature below the freezing point of the solvent, the solvent is removed by sublimation under reduced pressure and the solid solvent-free product is pulverized.

4. An aqueous dispersion of a polyester-imide powder, which contains from 40 to 80% by weight of water and, if appropriate, dispersing assistants, and from 60 to 20% by weight of a polyester-imide powder obtained by the process as claimed in claim 1 and having an average particle diameter of less than 1μ.

4,018,737

EMULSIONS OF ETHYLENE POLYMERS AND COPOLYMERS WITH CONTROLLED MOLECULAR WEIGHT AND PARTICLE SIZE

Glenn E. Teer; Jerry G. Higgins; George D. Warren, all of Big Spring, Tex., and Donald C. Ewert, Lansing, Ill., assignors to Cosden Technology, Inc., Big Spring, Tex.

Filed Jan. 6, 1975, Ser. No. 538,919
Int. Cl.² C08L 23/06
U.S. Cl. 260—29.6 XA 27 Claims

1. A process for preparing translucent ethylene polymer emulsions comprising polymerizing ethylene under a pressure of from about 1,400 to about 20,000 psi by contacting gaseous ethylene with an aqueous medium having a pH of from about 8.5 to about 14.0 at a temperature of from about 60° C to about 150° C, said aqueous medium containing a water soluble salt of persulfuric acid as initiator in an amount effective to initiate polymerization, an effective amount of an emulsifier which is below about 9% by weight of said aqueous medium, which emulsifier is selected from the group consisting of anionic emulsifiers, nonionic emulsifiers and mixtures thereof, and from about 0.1 to about 1% by weight of said aqueous medium of a mercaptan selected from the group consisting of alkyl mercaptans having from about 4 to about 20 carbon atoms, dithiobis(benzothiazole), benzyl mercaptan, and p-chlorobenzyl mercaptan to thereby form said aqueous emulsion of ethylene polymer particles having molecular weights in the range of from about 3,000 to 15,000 and average particle sizes between 100 and 500 angstroms.

4,018,738

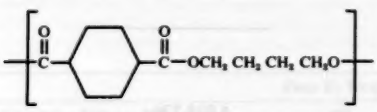
POLY(BUTYLENETEREPHTHALATE) COMPOSITION WITH NOVACULITE

Herbert L. Rawlings, New Martinsville, W. Va., assignor to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Feb. 6, 1976, Ser. No. 656,058
Int. Cl.² C08K 3/36, 9/06
U.S. Cl. 260—40 R 12 Claims

1. A filled synthetic resinous composition comprising 50 to 90 percent by weight of

a. poly(butyleneterephthalate) resin characterized by the repeating structural formula:



said poly(butyleneterephthalate) having an intrinsic viscosity of 0.6 to 1.5; and,

b. from 10 to 50 percent by weight novaculite having an average particle size of up to 5 microns.

4,018,739

TAR-URETHANE COMPOSITION

Masahiro Okamoto; Morio Kimura, both of Kitakyushu; Teruo Shibuya, Kawasaki; Shinji Yamamoto, Ichihara; Shinichi Hasegawa, Settsu; Yutaka Terada, Nishinomiya, and Teruho Adachi, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Nittetsu Chemical Industrial Co., Ltd., Tokyo, both of, Japan

Continuation-in-part of Ser. No. 368,376, June 8, 1973, abandoned. This application Aug. 26, 1975, Ser. No. 607,962
Claims priority, application Japan, June 9, 1972, 47-58053
Int. Cl.² C08G 2/28, 2/30
U.S. Cl. 260—59 R 22 Claims

1. A tar-urethane composition consisting essentially of (1) a non-thermosetting isocyanate-reactive tar obtained by reacting a tar produced as a by-product in the phenol synthesis via hydroperoxides with a formaldehyde in the presence of a basic catalyst selected from the group consisting of sodium hydroxide, potassium hydroxide, aqueous ammonia and amines and (2) a polyisocyanate, wherein said tar produced as a by-product in the phenol synthesis is a high boiling fraction obtained after distillation of phenols from the acid decomposition product of hydroperoxides produced in the phenol synthesis by the cumene method, the cresol synthesis by the cymene method or the resorcin and hydroquinone synthesis from diisopropylbenzene.

4,018,740

METHOD OF PRODUCING WATER-SOLUBLE AMINE-MODIFIED UREA-FORMALDEHYDE RESINS MODIFIED WITH POLYOXYALKYLENE ETHER

Anatoly Abramovich Kruglikov, ulitsa Vyazovskaya, 9, kv. 9; Lia Ilinichna Aronova, ulitsa Karla Marxa, 87, kv. 5; Vladimir Vasilievich Kuftarev, ulitsa Tsiolkovskogo, 3, kv. 9; Zoya Sergeevna Sevrjugina, ulitsa Pervomaiskaya, 74, kv. 25, all of Nizhny Tagil Sverdlovskoi oblasti, and Vera Konstantinovna Eletskaya, poselok "Pravdy", ulitsa Zhdanova, 21, kv. 41, Moskovskaya oblast, all of U.S.S.R.

Filed June 28, 1976, Ser. No. 700,149
Int. Cl.² C08G 14/02; C08L 61/20
U.S. Cl. 260—70 A 10 Claims

1. A method of producing water-soluble urea-formaldehyde resins modified with aliphatic polyamines, residing in that interaction is performed of 1 mole of urea, 1.5–3.0 moles of formaldehyde, and branched aliphatic polyamines, with molecular weight of 200–440 and the content of tertiary nitrogen 10–15 wt.%, at 80°–100° C and pH of the alkaline medium 7.2–9.5, which is attained by proper amounts of polyamines; a sulphonic acid selected from the group consisting of aromatic and aliphatic sulphonic acids of the general formula $R—SO_3H$, where R is a radical selected from the group consisting of aryls and alkyls, is introduced into the obtained mixture until pH of an acid medium equal to 4.8–6.0 is attained; an alkaline agent is added up to pH of an alkaline medium 7.2–9.5 with the formation of oligomer; said oligomer is interacted with polyoxyethylene ether of isooctylphenol, which has 7–11 oxyethylene units, at 100°–105° C and is introduced in amounts of 0.2–2.0 wt. parts per 100 wt. parts of the initial urea.

4,018,741

PROCESS FOR THE MANUFACTURE OF HIGHLY DISPERSE SOLIDS CONSISTING OF CROSSLINKED UREA-FORMALDEHYDE POLYCONDENSATION PRODUCTS

Alfred Renner, Muenchenstein, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 439,243, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 378,898, July 13, 1973, abandoned, which is a continuation of Ser. No. 299,479, Oct. 20, 1972, abandoned, which is a continuation of Ser. No. 65,330, Aug. 19, 1970, abandoned. This application Aug. 29, 1975, Ser. No. 609,144
Claims priority, application Switzerland, Sept. 12, 1969, 13829/69
Int. Cl.² C08G 2/28
U.S. Cl. 260—71 8 Claims

1. A process for the manufacture of highly disperse insoluble and infusible solids of crosslinked urea-formaldehyde polycondensation products consisting of primary particles having an average diameter of not greater than 1 micron which consists essentially of

A. forming an aqueous solution consisting essentially of water and a precondensate of urea and formaldehyde

B. mixing said aqueous solution with sulphamic acid at a temperature of from room temperature to 100° C to form a crosslinked gel, the pH during gel formation being from 1.0 to 1.6, and the molar ratio of formaldehyde to urea being from greater than 1.2 to 2.0 not later than at the time of gel formation, and

C. comminuting, drying and deagglomerating the resulting gel.

4,018,742

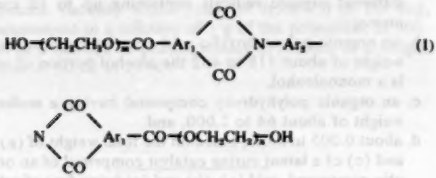
IMIDE-RING CONTAINING POLYESTER AND WIRE ENAMEL CONTAINING SAME

Yasuhiro Suzuki, and Katsuhiko Yamaguchi, both of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan

Filed Apr. 18, 1975, Ser. No. 569,430
Claims priority, application Japan, May 1, 1974, 49-48279
Int. Cl.[2] C08G 73/16
U.S. Cl. 260—75 N 21 Claims

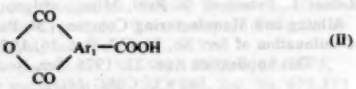
1. A polyester having imide rings in the molecule comprising the reaction product of

1. a polyhydric alcohol component comprising about 5 to 80% by weight of an imide ring containing diol represented by the following Formula (I)



(I)

wherein Ar_1 represents a trivalent aromatic group; Ar_2 represents a divalent aromatic group; and m and n each represents an integer of 1 to 6; with the diol being the reaction product of 2 moles of an aromatic tricarboxylic acid anhydride of the following formula (II)



(II)

wherein Ar_1 has the same meaning as above; with 1 mole of a diamine of the following formula (III)

$$H_2N - Ar_2 - NH_2 \quad \text{(III)}$$

wherein Ar_2 has the same meaning as above, in the presence of ethylene carbonate; and;

2. a polycarboxylic acid component comprising at least one of a polycarboxylic acid and a lower alkyl ester thereof; wherein the ratio of the polyhydric alcohol component (1) to the polycarboxylic acid component (2), as expressed by the —OH/—COOH molar ratio, is about 1.2 to 1.6.

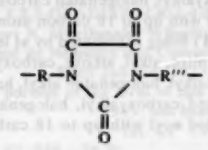
4,018,743

PROCESS FOR PREPARING TRIKETOIMIDAZOLIDINES

Kurt Kraft, Wiesbaden-Dotzheim, and Johannes Reese, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

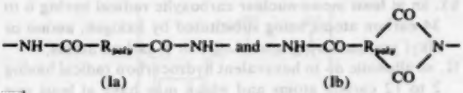
Continuation of Ser. No. 154,634, June 18, 1971, abandoned.
This application Feb. 28, 1975, Ser. No. 554,019
Claims priority, application Germany, June 19, 1970, 2030233
Int. Cl.[2] C08G 18/00
U.S. Cl. 260—77.5 CH 23 Claims

1. A polymer reaction product containing a plurality of units of the formula



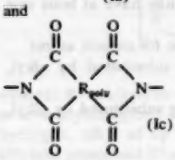
(I)

together with more than one unit selected from the group consisting of



(Ia) (Ib)

and



(Ic)

and obtained by reaction at a temperature in the range of −20° to 30 280° C at least one oxamidic ester (a) of Formula VII,

$$R-(NH-CO-CO-OR')_q \quad \text{(VII)}$$

at least one isocyanate (b) of Formula VIII

$$R'''-(N=C=O)_q \quad \text{(VIII)}$$

or compound forming an isocyanate under the aforesaid reaction conditions and at least one polycarboxylic acid or polycarboxylic acid anhydride forming a polycarboxylic acid under the aforesaid reaction conditions (c) of the formula $R_{poly}(COOH)_p$ in which formulae

R is a member selected from the group consisting of

aa. an at least mono-nuclear di- to hexavalent aromatic radical having 6 to 18 carbon atoms,

bb. an at least mono-nuclear di- to hexavalent heterocyclic radical having 5 to 12 carbon atoms,

cc. a radical as defined in (aa) being substituted by at most two substituents, referred to any one aryl group of the radical selected from the group consisting halogen, nitro, dialkylamino, diarylamino, alkylaryl-amino groups, alkyl, alkoxy, carboxyalkyl, carboxyaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl and halogenated acyl groups with up to 18 carbon atoms,

dd. a radical as defined in (bb) being substituted by a substituent selected from the group consisting of halogen, nitro, dialkylamino, diarylamino, alkylarylamino groups, alkyl, alkoxy, carboxyalkyl, carboxyaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl or halogenated acyl groups with up to 18 carbon atoms,

ee. a quinonyl radical;

R^V is an aliphatic hydrocarbon group having up to 18 carbon atoms, a cycloaliphatic hydrocarbon group with up to 8 carbon atoms, an unsubstituted monomuclear aromatic hydrocarbon group or a mononuclear aromatic hydrocarbon having one or more hydrocarbon substituents, said substituents having a total of up to 14 carbon atoms,

R''' is a member selected from the group consisting of

d1. an at least mono-cyclic di- to tetravalent carboxylic radical having 6 to 30 carbon atoms,

e1. an at least mono-cyclic di- to tetravalent heterocyclic radical having 6 to 40 carbon atoms,

f1. a radical d1) being substituted by at least one of the groups halogen, nitro, alkyl, alkoxy, carboxyalkyl, car-

boxyaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl and a halogenated acyl with up to 18 carbon atoms,

g1. a radical as defined in (e1) being substituted by at least one of the groups halogen, nitro, alkyl, alkoxy, carboxyalkyl, carboxaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl and halogenated acyl with up to 18 carbon atoms,

h1. an aliphatic radical with 1 to 20 carbon atoms;

R_{poly} is a member selected from the group consisting of

i1. an unsubstituted di- to hexavalent at least mono-cyclic radical having 6 to 34 carbon atoms,

k1. an at least mono-nuclear carboxylic radical having 6 to 34 carbon atoms being substituted by halogen, amino or alkyl groups having a total of 1 to 8 carbon atoms,

l1. an aliphatic di- to hexavalent hydrocarbon radical having 2 to 12 carbon atoms and which may have at least one double bond,

m1. a heterocyclic radical having 4 to 69 carbon atoms

o1. an aliphatic radical (l1) being substituted by alkyl, halogen or amino groups,

p1. a heterocyclic radical (m1) being substituted by alkyl, halogen or amino groups,

r is an integer from 2 to 6,

s is an integer from 2 to 4 and

p is an integer from 2 to 6,

and in which polymer reaction products 1 to r mols of oxamidic ester have been reacted with one mol of isocyanate or 1 to s mols of isocyanate have been reacted with one mol of oxamidic ester with the provisions that

I. more than $1/r$ of the alcohol groups of the oxamidic ester (a) have been removed by reaction with the isocyanate groups when an excess of ester groups of the oxamidic ester, referred to the isocyanate groups, have been used as starting material and that

II. more than $1/s$ of the isocyanate groups of the isocyanate (b) has been reacted, when an excess of isocyanate groups, referred to the ester groups of the oxamidic ester, has been used as a starting material, and

III. in which reaction product at least two ester groups of the oxamidic ester have been reacted, where an excess or equimolar amount of isocyanate has been used, and at least 2 isocyanate groups have been reacted where an excess or equimolar amount of ester groups of the oxamidic ester has been used, and

IV. wherein components (a) and (c) have been reacted in a molar proportion of (A') (0.97 to 0.03) to (C') (0.03 to 0.97) wherein the total of both components is always one mol provided the oxamidic ester and the polycarboxylic acid have the same functionality and wherein the molar proportion of the reaction components is

$$a(A') + c(C') = b(B')$$

wherein

a is the number of oxamidic ester groups in said A' mols of oxamidic ester,

b is the number of isocyanate groups in said B' mols of isocyanate,

c is the number of the carboxylic groups in C' mols of polycarboxylic acid

and a and b are integers of from 2 to 4 and c is an integer from 2 to 6 and wherein $b(B')$ is up to three times the amount of $a(A') + c(C')$.

4,018,744

STORAGE STABLE POLYESTER-POLYURETHANE-PRODUCING COMPOSITIONS

Larry G. Wolgemuth, Cherry Hill, N.J., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 457,942, April 4, 1974, Pat. No. 3,950,285. This application Feb. 13, 1976, Ser. No. 657,680

Int. Cl.² C08G *18/80, 18/34*

U.S. Cl. 260—77.5 B **2 Claims**

1. A storage-stable composition which is thermally curable to high molecular weight polyester polyurethanes comprising

a. an organic polycarbamic acid ester having the structural formula

$$R'OCHNR(NHCOR'')_n$$

wherein n is 1 to 5, R is an organic radical containing 2 to about 50 carbon atoms and R' and R'' are the same or different organic radicals containing up to 12 carbon atoms,

b. an organic polycarboxylic acid ester having a molecular weight of about 118 to 462 the alcohol portion of which is a monoalcohol,

c. an organic polyhydroxy compound having a molecular weight of about 64 to 2,000, and

d. about 0.005 to 5.0%, based on the total weight of (a), (b) and (c) of a latent curing catalyst comprised of an organotin compound, said (a), (b) and (c) being free of substituents which interfere with the desired reaction, the equivalent ratio of (a) to (b) varying from 1:9 to 9:1 and the equivalent ration of total (a) and (b) to (c) varying from 0.7 to 10:1.

4,018,745

POLYURETHANE WEAR-RESISTANT SURFACING

Robert L. Peterson, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 81,537, Oct. 16, 1970, abandoned. This application Apr. 22, 1976, Ser. No. 679,367

Int. Cl.² C08G *18/32*

U.S. Cl. 260—77.5 AT **23 Claims**

1. A tough, wear-resistant elastomer coating comprising the moisture-cured reaction product of a reaction mixture comprising

a. an aliphatic polyisocyanate-terminated prepolymer, and

b. a polymeric polyprimary amine having a molecular weight of at least 3,500, the relative amounts of said prepolymer and said polyamine in the reaction mixture being sufficient to provide about one amine group for each 10 to 200 isocyanate groups.

4,018,746

TRANSPARENT COPOLYAMIDES FROM M-XYLYLENE DIAMINE, AN ALIPHATIC DIAMINE AND TEREPHTHALIC ACID

Ludwig Brinkmann, Frankfurt am Main, and Walter Herwig, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 515,658, Oct. 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 347,142, April 2, 1973, abandoned. This application Mar. 26, 1976, Ser. No. 670,716

Claims priority, application Germany, Apr. 5, 1972, 2216261

Int. Cl.² C08G *69/26, 69/32*

U.S. Cl. 260—78 R **9 Claims**

1. A polyamide having improved form stability at elevated temperature, said polyamide being of the general formula

$$R_3\left[HN-R_1-NH-CO-R_2-CO\right]_x R_4$$

in which

R_1 represents meta-xylylene units, para-xylylene units in an amount of from 0 to 50 mol % of the meta-xylylene units, and at least one, straight-chain bivalent aliphatic hydrocarbon unit containing from 4 to 20 carbon atoms, said meta-xylylene, para-xylylene and bivalent aliphatic hydrocarbon units being randomly distributed in the macromolecule and the proportion of the aliphatic hydrocarbon units being from 5 to 90 mol %, based on the sum of the xylylene and aliphatic hydrocarbon units,

R_2 represents phenylene units selected from the group consisting of $p-C_6H_4-$, $m-C_6H_4-$, and mixtures thereof, and at least one bivalent aliphatic saturated hydrocarbon unit containing from 3 to 18 carbon atoms; said phenylene and aliphatic hydrocarbon units being randomly distributed over the macromolecule and the proportion of aliphatic units being from 10 to 90 mol %, based on the sum of the phenylene and aliphatic units,

R_3 represents H or $OC-R_2-COOH$ and

R_4 represents OH or $NH-R_1-NH_2$, and in which x indicates the degree of polymerization, measured as reduced specific viscosity within range of from 1.0 to 2.5 dl/g, determined in a solution of 1 g of the polyamide in 100 ml of a mixture of phenol/tetrachloroethane in a weight ratio of 60:40 at 25° C.

4,018,747
PRODUCTION OF FIBER-FORMING POLYAMIDES BY TRANSAMIDATION OF N-ALICYCLIC DIAMIDES WITH DICARBOXYLIC ACIDS

Russell E. Malz, Jr., Naugatuck; Robert W. Brown, Middlebury, and Harold Greenfield, Watertown, all of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 542,156, Jan. 20, 1975, abandoned. This application Apr. 20, 1976, Ser. No. 678,571

Int. Cl.² C08G *69/28*

U.S. Cl. 260—78 R **8 Claims**

1. A process for producing a fiber-forming N-alicyclic polyamide comprising mixing a dicarboxylic acid of the formula

$$HOOC-R-COOH$$

wherein R is a $-(CH_2)_z-$ group wherein z is an integer from 3 to 20, with an N-alicyclic diamide of the formula

$$R^1-CONH-R^2-NHCO-R^1$$

wherein R^1 and R^2 may be the same or different and are hydrogen, an alkyl radical having 1 to 18 carbon atoms, phenyl or benzyl, and R^2 is a cycloalkylene group having 6 to 12 carbon atoms or an alkanebiscycloalkylene group having 13 to 20 carbon atoms, and heating the mixture (I) under an inert atmosphere and atmospheric pressure for 2–10 hours at a temperature of from 220° to 350° C. and then (II) at a pressure of from 1 to 50 mm of Hg for ½ – 10 hours at a temperature of from 300° to 350° C, whereby there is produced an N-alicyclic polyamide containing repeating structural units having the formula

$$-CO-R-CONH-R^2-NH-$$

wherein R and R^2 are as defined previously, said polyamide having an inherent viscosity of at least 0.4 deciliters per gram measured at 25° C and a concentration of 0.5 gram of said polyamide in 100 milliliters of m-cresol.

4,018,748
POLYAMIDES CONTAINING 1,2,5-OXADIAZOLE-3,4-DICARBONYL GROUPS

Robert N. MacDonald, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

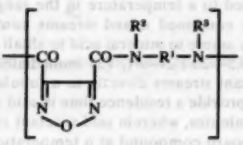
Filed Jan. 24, 1973, Ser. No. 326,175

The portion of the term of this patent subsequent to May 23, 1989, has been disclaimed.

Int. Cl.² C08G *69/32*

U.S. Cl. 260—78 R **3 Claims**

1. A polyamide consisting of repeating units of the formula



wherein R^1 is alkylene of 2 to 12 carbon atoms or an arylene or a bis-arylene group of 6–18 carbon atoms and R^2 and R^3 are hydrogen, alkyl of up to 6 carbon atoms or when R^1 is an alkylene group and R^2 and R^3 jointly can be alkylene of 2 to 12 carbon atoms, said polyamide having an inherent viscosity measured at 0.1% concentration in chloroform at 25° C between 0.1 and 10.

4,018,749
CURABLE COMPOSITION

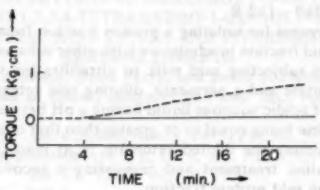
Masao Onizawa, Ohmiya, Japan, assignor to Sanyo Trading Co., Ltd., Tokyo, Japan

Filed Jan. 28, 1976, Ser. No. 653,123

Claims priority, application Japan, Jan. 29, 1975, 50-11407; Dec. 11, 1975, 50-146889

Int. Cl.² C08F *8/32*

U.S. Cl. 260—78 A **3 Claims**



1. A curable composition comprising a liquid polybutadiene rubber having bromine bonded to at least one of its ends, and at least one amino acid selected from the group consisting of arginine, lysine, hydroxylysine and ornithine.

4,018,750
CURABLE COMPOSITIONS CONTAINING CHLOROPRENE RUBBER

Masao Onizawa, Ohmiya, Japan, assignor to Sanyo Trading Co., Ltd., Tokyo, Japan

Filed Jan. 29, 1976, Ser. No. 653,630

Claims priority, application Japan, Feb. 3, 1975, 50-13329; June 24, 1975, 50-76807

Int. Cl.² C08F *8/32*

U.S. Cl. 260—78 A **3 Claims**

1. A vulcanizable composition comprising a chloroprene rubber and at least one amino acid selected from the group consisting or arginine, lysine, hydroxylysine, ornithine, cystine, asparagine, glutamine and citrulline.

4,018,751

CONTINUOUS PROCESS FOR AMINOAZOBENZENE

James Bryan Trecek, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 9, 1975, Ser. No. 566,594
Int. Cl.² C07C *107/06;* C09B *29/08*
U.S. Cl. 260—205 4 Claims

1. A continuous process for the preparation of a carbocyclic aromatic aminoazo compound comprising the steps of (1) intimately mixing a reactant stream containing a large excess of a carbocyclic aromatic primary amine, unsubstituted in the position para to the amino group, a mineral acid and water, with a reactant stream containing an aqueous solution of an alkali metal nitrite, each of said reactant streams having been separately heated to a temperature in the range of 10° C. to 40° C. and the combined mixed streams containing a mole ratio of primary amine to mineral acid to alkali metal nitrite in the range of 3.5—20:1.2—9:1, (2) immediately passing said premixed reactant streams directly to a tubular reactor, at a rate such as to provide a residence time in said reactor of from about 1 to 10 minutes, wherein said reactant streams react to form said aminoazo compound at a temperature in the range of 40° C. to 100° C., said temperature resulting solely from the heat of reaction, (3) neutralizing the reaction product steam, containing said aminoazo compound as the acid salt, with an aqueous alkali metal hydroxide, (4) separating the resulting organic phase from the aqueous phase, and (5) recovering said aromatic aminoazo compound from the organic phase.

4,018,752

ULTRAFILTRATION PROCESS FOR THE RECOVERY OF PROTEINS FROM MILK

Marcel Bühler, Orbe; Hans-Ueli Bohren, and Théodore Hodel, both of La Tour-de-Peilz, all of Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed July 25, 1974, Ser. No. 491,644
Claims priority, application Switzerland, July 31, 1973, 11117/73; June 7, 1974, 7779/74
Int. Cl.³ A23J *1/20*
U.S. Cl. 260—112 R 9 Claims

1. A process for isolating a protein fraction from milk containing said fraction in admixture with other substances, which comprises subjecting said milk to ultrafiltration to obtain a first retentate and a permeate, diluting said retentate with a volume of acidic aqueous liquid having a pH between 3 and 5, said volume being equal to or greater than that of said permeate, subjecting the diluted retentate to at least one further ultrafiltration treatment and recovering a second retentate containing said protein fraction.

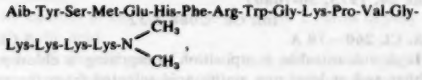
4,018,753

POLYPEPTIDES WITH ACTH-LIKE ACTIVITIES

Ken Inouye; Masaru Shin, both of Kobe, and Kunio Watanabe, Otsu, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed July 16, 1975, Ser. No. 596,245
Claims priority, application Japan, July 30, 1974, 49-87759
Int. Cl.² C07C *103/52;* A61K *37/40*
U.S. Cl. 260—112.5 R 4 Claims

1. A member selected from the group consisting of



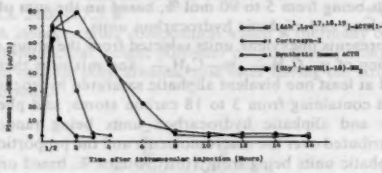
a non-toxic acid addition salt thereof, and a complex thereof.

4,018,754

NOVEL POLYPEPTIDES HAVING ACTH-LIKE ACTION

Ken Inouye; Masaru Shin, both of Kobe, and Kunio Watanabe, Otsu, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed July 16, 1975, Ser. No. 596,246
Claims priority, application Japan, July 30, 1974, 49-87758
Int. Cl.² C07C *103/52;* A61K *37/40*
U.S. Cl. 260—112.5 R 5 Claims



1. A member selected from the group consisting of a compound of the formula:

Aib—Tyr—Ser—Met—Glu—His—Phe—Arg—Trp—Gly—Lys—Pro—Val—Gly—$(Lys)_n$—Y

wherein *n* is an integer of 5–6 and Y is —OH or $—HN_2$ and is bound to the carbonyl group of the C-terminal lysine residue, a non-toxic acid addition salt thereof and a complex thereof.

4,018,755

EXTRACTION OF PROTEINS FROM VEGETABLE SEED COMPOSITIONS

Li Chuan Wang, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 12, 1975, Ser. No. 576,758
Int. Cl.² A23J *1/14*
U.S. Cl. 260—123.5 11 Claims

1. A method of extracting protein from vegetable seeds, comprising the steps of:

a. sonicating a vegetable seed composition selected from the group consisting of full-fat vegetable seed flakes, meal, grits, and flour and their defatted analogs and their toasted full-fat and defatted analogs in a suitable solvent in a solids:solvent ratio of from about 1:10 to 1:40 at a sonic frequency of about 20 KHz and at a sonic output power of from 100 to 500 watts for a time sufficient to solubilize from about 50 to 100 percent of the total protein in said vegetable seed composition;

b. separating the solids from the supernatant solution of protein resulting from step (a); and

c. recovering the protein from the supernatant solution resulting from step (b).

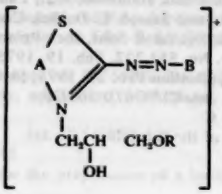
4,018,756

THIAZOLE AND BENZOTHIAZOLE CATIONIC DYES

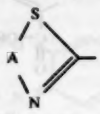
Masaaki Ohkawa, Takatsuki; Yoshio Tanaka, Osaka; Yoshiro Takeda, Takarazuka; Tadao Kinoshita, Nishinomiya, and Kazuyoshi Hirabayashi, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed June 14, 1971, Ser. No. 153,080
Claims priority, application Japan, June 12, 1970, 45-51301; June 12, 1970, 45-51302; Sept. 10, 1970, 45-79751
Int. Cl.² C09B *29/08, 29/36;* D06P *1/08, 3/70*
U.S. Cl. 260—146 R 13 Claims

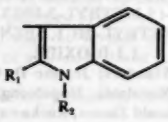
1. A compound of the formula



wherein the group

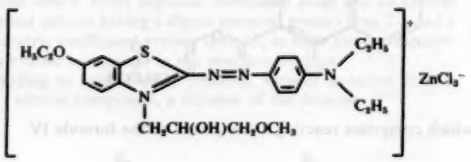


represents a group selected from the class consisting of thiazolyl or thiazolyl substituted at the 4- or 5-positions or both by methyl, ethyl, halogen, cyano or phenyl, and benzothiazolyl or benzothiazolyl substituted at the 6-position by alkyl having 1 to 3 carbon atoms, alkoxy having 1 to 2 carbon atoms, phenoxy, nitro, cyano, thiocyano, halogen, sulfamoyl or alkylsufonyl having 1 to 2 carbon atoms, B represents



wherein R_1 represents alkyl having 1 to 4 carbon atoms, aralkyl having 7 to 8 carbon atoms or phenyl and phenyl substituted by alkyl having 1 to 2 carbon atoms, alkoxy having 1 to 2 carbon atoms, chlorine atom, cyano or nitro, and R_2 represents hydrogen, alkyl having 1 to 4 carbon atoms, alkoxyalkyl having 3 to 6 carbon atoms, acetoxyethyl, β-chloroethyl, cyanoalkyl having 2 to 4 carbon atoms or carbamoylalkyl having 3 to 4 carbon atoms, and R represents alkyl having 1 to 4 carbon atoms, and Z^- is an anion.

13. A compound of the formula



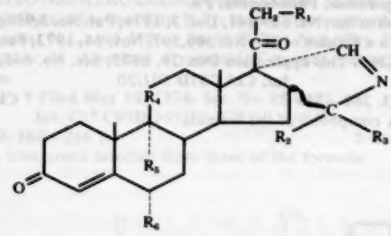
4,018,757

STEROIDAL[16α,17-C][2H]PYRROLES

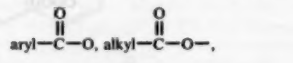
Ravi K. Varma, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 20, 1976, Ser. No. 688,207
Int. Cl.² C07J 71/00
U.S. Cl. 260—239.5 10 Claims

1. A steroid having the formula



or a 1,2-dehydro derivative thereof, wherein R_1 is hydrogen, hydroxy,



fluorine, chlorine or bromine; R_2 is alkyl or aryl; R_3 is aryl, cyano, alkylcarbonyl, arylcarbonyl, alkoxycarbonyl, aryloxycarbonyl, alkylsulfonyl, or arylsulfonyl; R_4 is carbonyl, β-hydroxymethylene, β-chloromethylene, or β-bromomethylene; R_5 is hydrogen, fluorine, chlorine or bromine; and R_6 is hydrogen, fluorine or methyl; wherein aryl is phenyl or phenyl substituted with fluorine, chlorine, bromine, nitro, cyano, alkyl or alkoxy; and alkyl and alkoxy are groups having 1 to 6 carbon atoms.

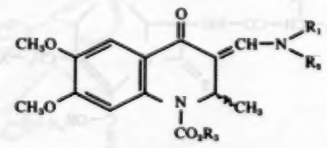
4,018,758

3-AMINOMETHYLENE-6,7-DIMETHOXY-2-METHYL-4-OXO-1,2,3,4-TETRAHYDRO-1-QUINOLINE CARBOXYLIC ACID ESTERS AND INTERMEDIATES LEADING THERETO

Michael R. Johnson, Gales Ferry, and Jacob J. Plattner, East Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 628,808, Nov. 4, 1975, Pat. No. 3,978,064.
This application Apr. 12, 1976, Ser. No. 676,103
Int. Cl.² C07D 401/06, 413/06
U.S. Cl. 260—240.3 1 Claim

1. A racemic compound selected from the group consisting of



wherein R_1 and R_2 taken together with the nitrogen to which they are attached form a heterocyclic ring selected from the group consisting of piperidino, pyrrolidino, and morpholino and R_3 is selected from the group consisting of alkyl having from one to five carbon atoms, phenyl, benzyl and mono-substituted benzyl and phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl, methoxy and trifluoromethyl.

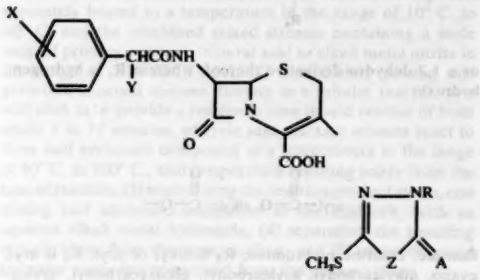
4,018,759

3-HETEROCYCLICTHIOMETHYLCEPHALOSPORINS

David Alan Berges, Audubon, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 529,141, Dec. 3, 1974, Pat. No. 3,957,768, which is a division of Ser. No. 306,507, Nov. 14, 1972, Pat. No. 3,868,369. This application Dec. 29, 1975, Ser. No. 645,105
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C 7 Claims

1. A compound of the formula



where

X is H, CH_2OH, SR, or OR;

Y is OH;

A is O or S;

Z is S; and

R is hydrogen or C_1-C_4 alkyl

or a nontoxic pharmaceutically acceptable salt thereof.

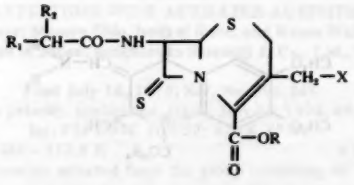
4,018,760

THIO-β-LACTAM CEPHALOSPORINS

Christopher M. Cimarusti, Hamilton, N.J.; Paul Wojtkowski, Wilmington, Del., and Joseph E. Dolfini, Cincinnati, Ohio, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 551,222, Feb. 19, 1975, Pat. No. 3,971,780. This application Feb. 20, 1976, Ser. No. 659,863
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C 9 Claims

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, trihaloethyl, alkali metal or alkaline earth metal; R_1 is hydrogen, lower alkyl, saturated or unsaturated cycloalkyl of 3 to 7 carbons, phenyl, phenyl-lower alkyl, phenoxy, thienyl, furyl, oxazolyl, isoxazolyl, or thiazolyl; R_2 is hydrogen, amino, carboxy, hydroxy or ureido; and X is lower alkyl thiadiazolyl thio or lower alkyltetrazolyl thio.

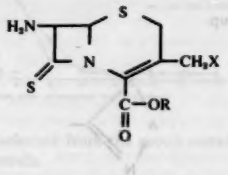
4,018,761

THIO-β-LACTAM CEPHALOSPORINS

Christopher M. Cimarusti, Hamilton, N.J.; Paul Wojtkowski, Wilmington, Del., and Joseph E. Dolfini, Cincinnati, Ohio, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 551,222, Feb. 19, 1975, Pat. No. 3,971,780. This application Feb. 20, 1976, Ser. No. 659,864
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C 3 Claims

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, trihaloethyl, alkali metal or alkaline earth metal and X is lower alkylthiadiazolylthio or lower alkyltetrazolylthio.

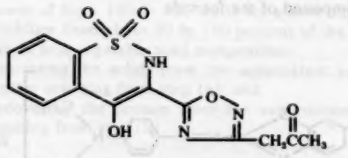
4,018,762

PROCESS FOR THE PREPARATION OF 4-HYDROXY-3-(5-METHYL-3-ISOXAZOLYLCARBAMOYL)-2-METHYL-2H-1,2-BENZOTHIAZINE 1,1-DIOXIDE

Arthur C. Fabian, Flanders; Jerome D. Genzer, Livingston; Charles Francis Kasulanis, Hopatcong; John Shavel, Jr., Mendham, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

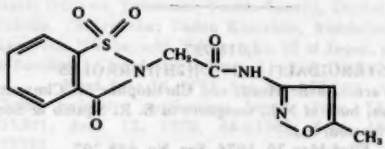
Division of Ser. No. 644,986, Dec. 29, 1975, which is a division of Ser. No. 577,568, May 21, 1975, Pat. No. 3,957,772. This application June 18, 1976, Ser. No. 697,595
Int. Cl.² C07D *279/02*
U.S. Cl. 260—243 R 10 Claims

1. A process for preparing a compound of the formula V:



(V)

which comprises reacting a compound of the formula IV:



(IV)

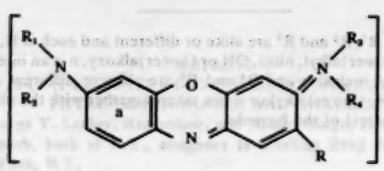
with an alkali metal alkoxide of a lower alcohol in an inert solvent at a controlled temperature followed by acidification.

4,018,763
PROCESS FOR THE MANUFACTURE OF BASIC OXAZINE DYES

Peter Moser, Binningen, and Alex Nicopoulos, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,795
Claims priority, application Switzerland, Apr. 29, 1974, 5873/74
Int. Cl.² C07D 265/12
U.S. Cl. 260—245 8 Claims

1. A process for the preparation of a basic oxazine dye of the formula



wherein

R is lower alkoxy or lower alkyl,

R_1 and R_2 are independently lower alkyl which is unsubstituted or substituted by halo, cyano, hydroxy, methoxy, ethoxy, phenoxy or phenyl; or

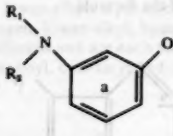
R_1 and R_2 together with the nitrogen to which they are attached represent piperidino or morpholino,

R_3 and R_4 are independently hydrogen or lower alkyl which is unsubstituted or substituted by halo, cyano, hydroxy, methoxy, ethoxy, phenoxy or phenyl,

the benzene ring *a* may be further substituted by halo, methoxy, methyl or a fused benzene ring, and

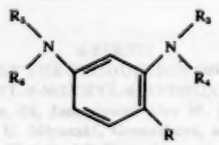
X is an anion

which comprises reacting a phenolic compound of the formula



with nitrous acid at a temperature below 50° C in the presence of a strong inorganic acid and in a polar, water-miscible solvent selected from the group consisting of lower alcohols, cyclic ethers, lower aliphatic carboxylic acids and an aprotic dipolar solvent having a dipole moment greater than 2.5 and a dielectric coefficient greater than 15, to form the corresponding nitroso compound in the reaction mixture,

adding to said reaction mixture, without isolation of said nitroso compound, a diamine of the formula



wherein

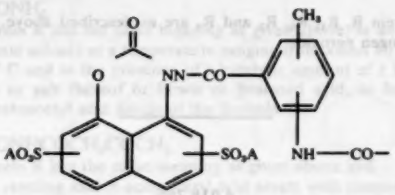
R_5 and R_6 are independently hydrogen or lower alkyl, to form said basic oxazine dye at a temperature between 20° to 120° C, and recovering said dye from the reaction mixture.

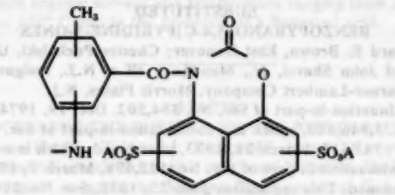
4,018,764
UREYLENEBIS METHYL-PHENYLENE-CARBONYL-BIS-DIHYDRO-2-OXO-NAPHTHOXAZINE DISULTONIC ACIDS

Seymour Bernstein, New City, N.Y.; Robert Herman Lenhard, Paramus, N.J., and Milton David Heller, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 10, 1976, Ser. No. 684,695
Int. Cl.² C07D 265/00, 273/00, 295/00
U.S. Cl. 260—246 R 2 Claims

1. A compound selected from those of the formula:





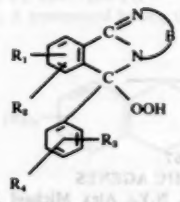
wherein A is hydrogen, alkali metal or alkaline earth, with the proviso that A is identical in the same compound.

4,018,765
PROCESS FOR THE PREPARATION OF CERTAIN HYDROPEROXY DERIVATIVES

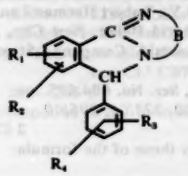
Werner Metlesics, Clifton, and Leo Henryk Sternbach, Upper Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 493,020, July 30, 1974, Pat. No. 3,929,766, which is a division of Ser. No. 639,315, May 18, 1967, Pat. No. 3,888,846, which is a continuation-in-part of Ser. No. 626,965, March 30, 1967, abandoned. This application Oct. 2, 1975, Ser. No. 618,864
Int. Cl.³ C07D 401/00, 403/00
U.S. Cl. 260—239 BC 1 Claim

1. A process for the preparation of a hydroperoxy derivative of the formula



wherein B represents an alkylene chain of 2 to 4 carbon atoms in which one or more of the hydrogens can be replaced by lower alkyl; and R_1, R_2, R_3 and R_4 are each independently selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy, hydroxy, and trifluoromethyl, which comprises treating a compound of the formula:



wherein B, R_1, R_2, R_3 and R_4 are as described above, with hydrogen peroxide.

4,018,766

SUBSTITUTED BENZOPYRANO[3,4-C]PYRIDINE-5-ONES

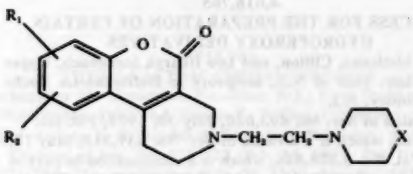
Richard E. Brown, East Hanover; Chester Puchalski, Dover, and John Shavel, Jr., Mendham, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 534,502, Dec. 19, 1974, Pat. No. 3,946,008, which is a continuation-in-part of Ser. No. 343,613, March 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 122,498, March 9, 1971, abandoned. This application June 25, 1975, Ser. No. 590,346

Int. Cl.² C07D *491/04*

U.S. Cl. 260—247.2 B **4 Claims**

1. A compound of the formula:



I

wherein R_1 and R_2 may be hydrogen, hydroxy, or lower alkyl of 1 to 6 carbon atoms, with the proviso that either R_1 or R_2 must be lower alkyl; and

wherein X may be oxygen, sulfur, $-CH_2CH_2-$, a valence bond, $-CHR_3$ or NR_3 where R_3 is hydrogen, a lower alkyl of 1 to 6 carbon atoms, or a lower alkanoyl group of 1 to 6 carbon atoms.

4,018,767

ANTI-ARRHYTHMIC AGENTS

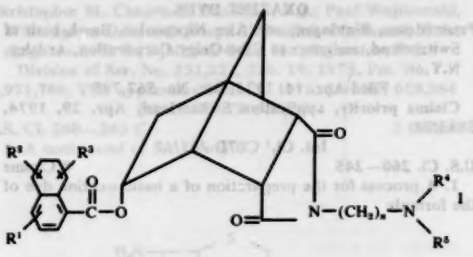
Joseph Paul Buyniski, Syracuse, N.Y.; Alex Michael Jelenevsky, Greensboro, N.C., and Ronald Leslie Buchanan, Fayetteville, N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed May 22, 1975, Ser. No. 579,763

Int. Cl.² C07D *413/06, 209/94, 401/06, 403/06*

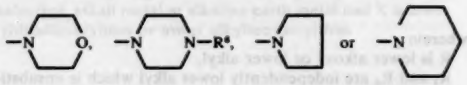
U.S. Cl. 260—247.2 A **15 Claims**

1. A compound having the formula



I

wherein R^1, R^2 and R^3 are alike or different and each is H, Cl, Br, F, (lower)alkyl, nitro, OH or (lower)alkoxy, n is an integer of 2 to 4 inclusive and R^4 and R^5 are alike or different and each is H, (lower)alkyl or when taken together with the nitrogen a radical of the formula



in which R^6 is (lower)alkyl; or a pharmaceutically acceptable acid addition salt thereof.

4,018,768

[1]BENZOTHIENO [3,2-d]-v-TRIAZINES AND SYNTHESIS THEREOF

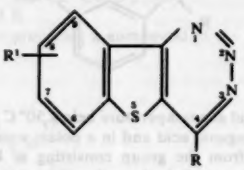
Joseph Andrew Yahner, New Palestine, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 2, 1975, Ser. No. 636,885

Int. Cl.² C07D *253/08*

U.S. Cl. 260—248 AS **14 Claims**

1. A compound of the formula



wherein R represents
hydrogen,
chloro,
methoxy,
ethoxy,
amino,
hydrazino,
methylamino,
ethylamino,
dimethylamino or
diethylamino;
R^1 represents
hydrogen,
chloro,
fluoro,
bromo,
methyl or
nitro;
provided that R^1 represents hydrogen when R represents a group other than chloro.

4,018,769
UREA CYANURATE MANUFACTURE

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed May 17, 1976, Ser. No. 687,363
Int. Cl.² C07D 251/30
U.S. Cl. 260—248 NS 8 Claims

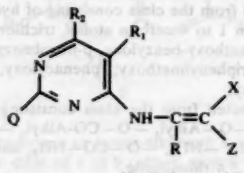
1. The method of producing urea cyanurate from urea including the steps of heating undissolved urea with a catalytic amount of elemental sulfur under substantially anhydrous conditions to a temperature of about 190° to about 320° C. for a period sufficient to convert said urea to a reaction product containing urea cyanurate.

4,018,770
N-(2-(PYRIDINYL)-4-PYRIMIDINYL)-AMINOMETHYLENEMALONATES AND ANALOGS

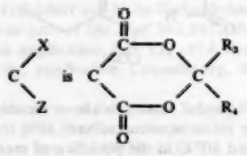
George Y. Lesher, Rensselaer, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 555,067
Int. Cl.² C07D 239/42
U.S. Cl. 260—256.4 N 8 Claims

1. A compound of the formula



where Q is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents or N-oxide thereof, R is hydrogen or lower-alkyl, R_1 is hydrogen, lower-alkyl or cyano, R_2 is hydrogen, lower-alkyl, hydroxy or halo, X and Z are the same or different and are each selected from lowercarbalkoxy, lower-alkanoyl, carbamyl and cyano, or



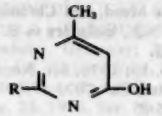
where r_3 and R_4 are each lower-alkyl, or X is hydrogen.

4,018,771
PROCESS FOR THE PRODUCTION OF 2-ALKYL OR 2-CYCLOALKYL-4-METHYL-6-HYDROXYPYRIMIDINES

John T. Gupton, III, Jamestown; Alex M. Jelenevsky, Nashville; Teruko U. Miyazaki, Greensboro, and Harris E. Petree, Kernersville, all of N.C., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 23, 1976, Ser. No. 711,035
Int. Cl.² C07D 239/34
U.S. Cl. 260—251 R 10 Claims

1. A process for the preparation of a 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidine of the formula



wherein R represents alkyl of 1 to 4 carbon atoms and cycloalkyl of 3 to 6 carbon atoms, which comprises

1. reacting diketene and an acid amide of the formula

$RCONH_2$

wherein R has the same meaning as given above, in an inert organic solvent at a temperature ranging from about 40° C to 150° C and in the presence of a catalytic amount of a Lewis base or salt thereof or Lewis or Brønsted acid, to form a N-acetoacetyl acid amide of the formula

$RCONHCOCH_2COCH_3$

wherein R has the same meaning as given above and

2. reacting said N-acetoacetyl acid amide with ammonia in an inert organic solvent at a temperature ranging from about 80° to 150° C and in the presence of a Brønsted acid.

4,018,772
PROCESS FOR THE PURIFICATION OF BICYCLOMYCIN

Masaru Kurita, Takatsuki; Kazuyoshi Jomon, Kawanishi; Tadaaki Komori, Takatsuki, and Isami Nakatani, Ikeda, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Jan. 17, 1975, Ser. No. 541,929
Claims priority, application Japan, Jan. 21, 1974, 49-9481
Int. Cl.² A61K 35/66; C07D 241/00
U.S. Cl. 260—268 BC 6 Claims

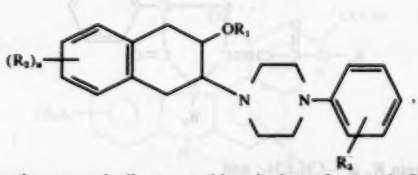
1. A process for the purification of bicyclomycin comprising adsorbing bicyclomycin with a macroporous nonionic styrene polymer adsorption resin crosslinked with divinylbenzene from an aqueous contaminated solution at a pH of about 2–8, and eluting said adsorbed bicyclomycin from said resin with a hydrophilic solvent.

4,018,773
PHENYLPIPERAZINOTETRAHYDRONAPHTHOLS AND DERIVATIVES

Michael E. Condon, Lawrenceville; Frederic P. Hauck, Somerville, and Joyce Reid, Highland Park, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sept. 15, 1975, Ser. No. 613,721
Int. Cl.² C07D 295/08
U.S. Cl. 260—268 PH 30 Claims

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen; R_2 is hydrogen, halogen, lower alkyl, hydroxy, or alkoxy; R_3 is hydrogen; halogen, lower alkyl, alkoxy, alkylthio, trifluoromethyl or nitro; and *n* is 1, 2 or 3; wherein the terms lower alkyl, alkoxy, and alkylthio refer to groups having 1 to 4 carbon atoms.

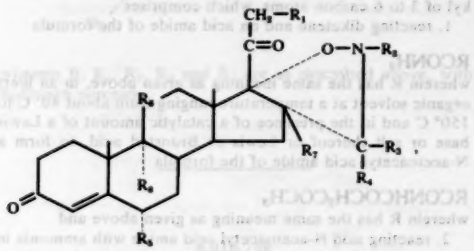
4,018,774

STEROIDAL [16α,17-D]ISOXAZOLIDINES

Ravi K. Varma, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 13, 1976, Ser. No. 657,791
Int. Cl.² C07J 17/00
U.S. Cl. 260—239.55 R 33 Claims

1. A steroid having the formula



or a 1,2-dehydro derivative thereof, wherein R_1 is hydrogen, hydroxy, alkanoyloxy, fluorne, chlorine or bromine; R_2 is alkyl or aryl; R_3 is alkyl, aryl, alkanoyl,

alkoxy-carbonyl or cyano; R_4 is hydrogen, alkyl or aryl; R_5 is hydrogen, fluorine or methyl; R_6 is carbonyl, β-hydroxymethylene, or β-chloromethylene; R_7 is hydrogen or methyl; and R_8 is fluorine or chlorine; with the proviso that when R_8 is chlorine R_6 is β-chloromethylene; wherein alkyl and alkoxy refer to groups having 1 to 6 carbon atoms; wherein alkanoyl to a group having 1 to 7 carbon atoms; and wherein to a group having 1 t 7 carbon atoms; and wherein aryl refers to phenyl and phenyl substituted with halogen, nitro, cyano, or alkoxy.

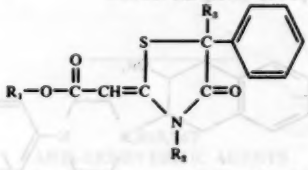
4,018,775

5-PHENYL-THIAZOLIDIN-4-ONE DERIVATIVES

Gerhard Satzinger, Denzlingen, and Manfred Herrmann, St. Peter, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Apr. 30, 1975, Ser. No. 572,987
Claims priority, application Germany, May 16, 1974, 2423725
Int. Cl.² C07D 277/34
U.S. Cl. 260—293.68 8 Claims

1. A 5-Phenyl-thiazolidin-4-one derivative of the formula:



wherein R_1 is $-CH_2CH_3$; and
wherein R_2 is $-CH_3$, or $-CH_2CH_3$; and
wherein R_3 is 2-diethylamino ethyl, N-piperidino, methyl, β-hydroxyethylamino, N-pyrrolidino, or diethylamino.

3. The derivative according to claim 1 wherein R_2 is $-CH_2CH_3$, and R_3 is N-piperidino, and which is ethyl 3-ethyl-5-phenyl-5-N-piperidino-4-oxo-$\Delta^{2,}$ -thiazolidine-acetate.

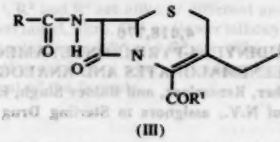
4,018,776

PROCESS FOR THE PREPARATION OF CEPHALOSPORINS FROM THE CORRESPONDING AZETIDINONE-THIAZOLINE DERIVATIVES

Maurizio Foglio; Paolo Masi; Antonino Suarato, and Giovanni Franceschi, all of Milan, Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

Filed Aug. 4, 1975, Ser. No. 601,586
Claims priority, application United Kingdom, Aug. 7, 1974, 34724/74
Int. Cl.² C07D 501/08
U.S. Cl. 260—243 C 2 Claims

1. A process for preparing a celphalosporin of structure:



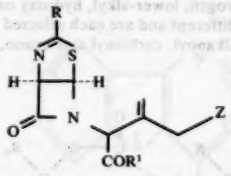
(III)

where R is selected from the class consisting of hydrogen, alkyl having from 1 to 4 carbon atoms, cyano-methyl, thienyl-methyl, furyl-methyl, naphthyl-methyl, phenyl-methyl, phenoxy-methyl, phenyl-isopropyl, phenoxy-isopropyl, pyridyl-4-thiomethyl, and tetrazolyl-1-methyl;

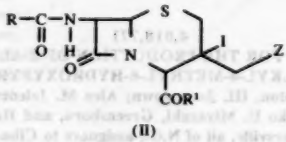
R' is selected from the class consisting of hydroxyl, alkoxy having from 1 to 4 carbon atoms, trichloroethoxy, benzyloxy, p-methoxy-benzyloxy, p-nitrobenzyloxy, benzhydryloxy, triphenylmethoxy, phenacyloxy, and p-halophenacyloxy;

and Z is selected from the class consisting of hydrogen, hydroxyl, —O—Alkyl, —O—CO-Alkyl, —Br, —I, $-N_3$, $-O\text{-}COCH_3$, $-NH_2$, —O—CO—NH_2, and 2-mercapto-5-methyl-1,3,4-thiadiazole;

wherein a compound (I) of structure:



in which R, R¹ and Z have the above meanings, is reacted with iodine in an aqueous solvent at a temperature between 5° and 80° C in the presence of mercuric oxide or with azo-bis-isobutyronitrile under the influence of light or heat, to give an intermediate (II) of structure:



(II)

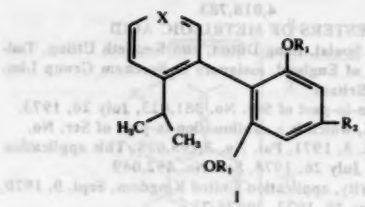
in which R, R¹ and Z have the above meanings,
and the said intermediate (II) is then reacted in a chloroform solution with triethylamine or pyridine to give the desired compound (III) which is then isolated and purified.

4,018,777
2-SUBSTITUTED-5-ALKYL RESORCINOLS

Harold Elmer Zaugg, Lake Forest; Cheuk Man Lee, Libertyville; Raymond John Michaels, Mundelein, and Nicholas Peter Piotnikoff, Lake Bluff, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

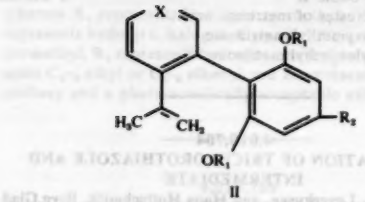
Filed Nov. 14, 1975, Ser. No. 632,126
Int. Cl.² C07D *213/55, 213/30*
U.S. Cl. 260—295.5 R 13 Claims

1. A 2-substituted -5-alkyl resorcinol having one of the following formulas



I

or



II

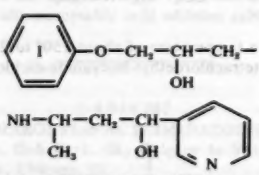
wherein R_1 is hydrogen or lower-alkanoyl; R_2 is a straight or branched chain alkyl of 1 to 9 carbon atoms; and X is nitrogen.

4,018,778
DERIVATIVES OF 1-PHENOXY-3-AMINO-PROPANE-2-OL AND PROCESS FOR THEIR PRODUCTION

Thomas Raabe, Heusenstamm; Josef Scholtholt, Frankfurt am Main, and Rolf-Eberhard Nitz, Bergen-Enkheim, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Frankfurt am Main-Fechenheim, Germany

Continuation-in-part of Ser. No. 362,567, May 22, 1973, abandoned. This application July 12, 1974, Ser. No. 488,194
Claims priority, application Luxembourg, May 24, 1972, 65414
The portion of the term of this patent subsequent to Aug. 20, 1991, has been disclaimed.
Int. Cl.² C07D *213/28*
U.S. Cl. 260—296 AE 13 Claims

1. Derivative of 1-phenoxy-3-amino-propane-2-ol having the structural formula



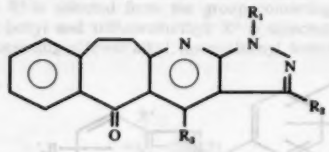
in which the phenol nucleus I may be mono-, di- or tri-substituted by alkyl, alkenyl, alkinyl, cycloalkyl, cyclo-alkenyl, alkoxy, alkenyloxy, alkinyloxy, phenyl, halogen or the radical-NR_1R_2, in which R_1 stands for alkyl or acyl and R_2 stands for hydrogen or alkyl, their aldehyde condensation products, and their acid addition salts.

4,018,779
DERIVATIVES OF 10,11-DIHYDROBENZO[4,5]CYCLOHEPTA[1,2-B]-PYRAZOLO[4,3-e]PYRIDINE-5(1H)ONES

Hans Hoehn, Tegernheim, Germany; Jack Bernstein, New Brunswick, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 25, 1976, Ser. No. 670,332
Int. Cl.² C07D *471/04*
U.S. Cl. 260—296 P 16 Claims

1. A compound of the formula



wherein R_1 is lower alkyl, phenyl or phenyl-lower alkyl; R_2 is hydrogen, lower alkyl or phenyl; R_3 is hydrogen, hydroxy, lower alkoxy, halogen, di (lower alkyl) amino (lower alkoxy) or the group

wherein R_4 and R_5 each is hydrogen, lower alkyl, phenyl, carbo-lower alkoxy or di (lower alkyl) amino (lower alkyl) or

together is one of the unsubstituted heterocyclics piperidine, piperazine, morpholine or thiamorpholine or one of said heterocyclics substituted with a lower alkyl or hydroxy lower alkyl group;

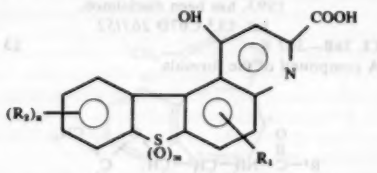
and salts thereof.

4,018,780
[1]BENZOTHIENO[3,2-F]QUINOLINECARBOXYLIC ACIDS

Larry R. Lappi, Stillwater, and Edward H. Erickson, Woodbury, both of Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

Filed Aug. 25, 1975, Ser. No. 607,626
Int. Cl.² C07D *495/22*
U.S. Cl. 260—287 C 21 Claims

1. A compound of the formula



wherein R_1 is hydrogen, halogen, lower alkyl or lower alkoxy, R_2 is halogen, lower alkyl or lower alkoxy and when n is 2, R_2 can represent lower alkyl and lower alkoxy, *m* is zero, one or two and *n* is zero, one or two, lower alkyl esters and pharmaceutically acceptable salts thereof.

4,018,781
2-ARYL SUBSTITUTED ISOXAZOLO(2,3-ALPHA)PYRIDINYL HALIDES

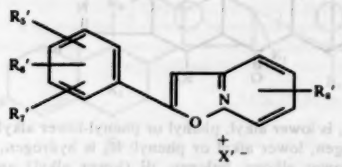
David T. Connor, Parsippany; Patricia A. Young, Madison, and Maximilian von Strandtmann, Rockaway Township, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 611,281, Sept. 8, 1975, Pat. No. 3,983,237. This application May 27, 1976, Ser. No. 690,478

Int. Cl.² C07D *498/00*

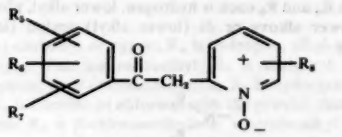
U.S. Cl. 260—297 B 3 Claims

1. A process for preparing a compound having the formula II:



II

wherein R_5', R_6' and R_7' are each hydrogen, halogen, hydroxy, lower alkyl, or lower alkoxy; R_8' is hydrogen or lower alkyl and X′ is a bromide, chloride or iodide salt, which comprises treating a compound of the formula III:



III

wherein R_5, R_6 and R_7 are each hydrogen, halogen, hydroxy, lower alkyl or lower alkoxy; and R_8 is hydrogen or lower alkyl with a hyrohalide acid and a lower alkanoic acid, compound II retaining said alkoxy groups only when compound III: (a) contains a halogen substituent on the phenyl para to alkoxy group or (b) said alkoxy group is ortho to the carbonyl and R_8 is lower alkyl ortho to the N-oxide.

4,018,782
2,2-DIMETHYL-3R-CARBOXY-6S-ACYLAMIDO-1-OXA-4-AZA-5R-BICYCLO[3,2,0]HEPTAN-7-ONES

Saul Wolfe, Kingston, Canada, assignor to Queen's University, Ontario, Canada

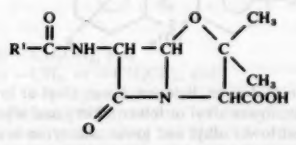
Division of Ser. No. 242,842, April 10, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,436

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² C07D *263/52*

U.S. Cl. 260—307 F 13 Claims

1. A compound of the formula



wherein

is acyl other than phenylacetyl or phenoxyacetyl or a non-toxic, pharmaceutically acceptable salt thereof.

4,018,783
ESTERS OF METRIZOIC ACID

Maurice John Soulal, Long Ditton, and Kenneth Utting, Tadworth, both of England, assignors to Beecham Group Limited, Great Britain

Continuation-in-part of Ser. No. 381,023, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 178,843, Sept. 8, 1971, Pat. No. 3,795,698. This application July 26, 1974, Ser. No. 492,049

Claims priority, application United Kingdom, Sept. 9, 1970, 43070/70; June 28, 1973, 30875/73

Int. Cl.² C07C *103/46*; C07D *307/77*

U.S. Cl. 260—343.3 R 3 Claims

1. Phthalide ester of metrizoic acid.
2. Pivaloyloxymethyl metrizoate.
3. α-Pivaloyloxyethyl metrizoate.

4,018,784
PREPARATION OF TRICHLOROTHIAZOLE AND INTERMEDIATE

Günther Beck, Leverkusen, and Hans Holtschmidt, Berg.Gladbach, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

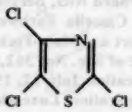
Filed Dec. 9, 1975, Ser. No. 639,136

Claims priority, application Germany, Dec. 12, 1974, 2458824

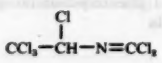
Int. Cl.² C07D *277/32*

U.S. Cl. 260—302 R 7 Claims

1. A process for the preparation of trichlorothiazole of the formula

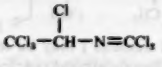


comprising reacting 1,2,2,2-tetrachloroethyl-isocyanide-dichloride of the formula



with sulfur at a temperature of about 150° to 250° C.

4. 1,2,2,2-tetrachloroethyl-isocyanide-dichloride of the formula



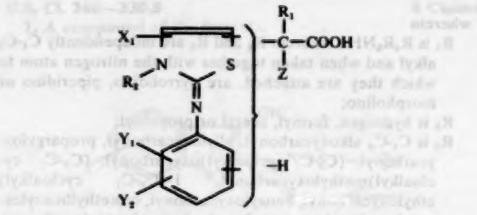
5. The process for making 1,2,2,2-tetrachloroethyl-isocyanide-dichloride according to claim 4, which comprises reacting chloral-formamide with chlorine and a highly active inorganic acid chloride.

4,018,785
CERTAIN 2-IMINOTHIAZOLINE COMPOUNDS

Ryozo Maeda, Osaka, and Katsumi Hirose, Kishiwada, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Dec. 3, 1975, Ser. No. 637,479
Claims priority, application Japan, Dec. 6, 1974, 49-140766
Int. Cl.² C07D 277/38, 277/42
U.S. Cl. 260—306.7 T 21 Claims

1. A member selected from the group consisting of a compound represented by the formula:



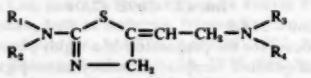
wherein X_1 represents hydrogen or methyl; Y_1 and Y_2 each represents hydrogen, halogen, C_{1-3} alkyl, C_{1-3} alkoxy or trifluoromethyl; R_1 represents hydrogen, methyl or ethyl; R_2 represents C_{1-3} alkyl or C_{3-5} alkenyl and Z represents hydrogen or carboxy and a pharmaceutically acceptable salt thereof.

4,018,786
2-AMINOTHIAZOLINES AND A PROCESS FOR PREPARATION THEREOF

Armand Amselem, Toulouse, France, assignor to Centre d'Etudes pour l'Industrie Pharmaceutique, Toulouse, France

Filed Aug. 6, 1974, Ser. No. 495,214
Int. Cl.² C07D 277/42
U.S. Cl. 260—306.7 T 6 Claims

1. A thiazoline of the formula:



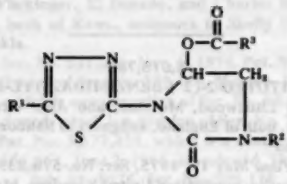
wherein R_1 and R_2 are each selected from hydrogen, alkenyl having 1–12 carbon atoms, alkyl having 1–12 carbon atoms, cycloalkyl having 4–12 carbon atoms, phenyl, cycloalkylphenyl wherein the cycloalkyl moiety has 4–12 carbon atoms, phenylalkyl wherein the alkyl moiety has 1–12 carbon atoms, halogencycloalkyl having 4–12 carbon atoms, halogenphenyl, halogenoalkyl having 1–12 carbon atoms and the same monosubstituted by a hydroxy, with the proviso that at least one of R_1 and R_2 is cyclic, R_3 and R_4 are each independently selected from hydrogen and alkyl having 1–12 carbon atoms, and their pharmaceutically acceptable acid addition salts.

4,018,787
1-THIADIAZOLYL-5-ACYLIMIDAZOLIDINONES

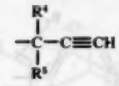
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed June 13, 1975, Ser. No. 587,006
The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.
Int. Cl.² C07D 417/00
U.S. Cl. 260—306.8 D 8 Claims

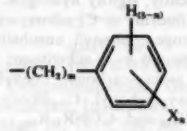
1. A compound of the formula



wherein R^1 is selected from the group consisting of butyl, phentyl, hexyl and trifluoromethyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and



wherein R^4 and R^5 are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms; and R^3 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl, lower alkynyl, lower monoalkoxyalkyl, monocycloalkyl of from 3 to 7 carbon atoms and



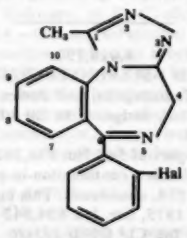
wherein X is selected from the group consisting of lower alkyl, lower alkoxy, halogen, lower haloalkyl, lower alkylthio, nitro and cyano; *n* is an integer from 0 to 3 and *m* is the integer 0 or 1; provided that when R^3 is methyl then R^2 is lower haloalkyl or contains at least 2 carbon atoms.

4,018,788
6-(O-HALOPHENYL)-1-METHYL-4H-s-TRIAZOLO[4,3-a][1,4]-BENZODIAZEPINE

Jackson B. Hester, Jr., Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 586,959, June 16, 1975, abandoned, which is a continuation of Ser. No. 496,219, Aug. 9, 1974, abandoned, which is a continuation of Ser. No. 361,481, May 18, 1973, abandoned, which is a continuation of Ser. No. 120,760, March 3, 1977, abandoned. This application Dec. 24, 1975, Ser. No. 644,368
Int. Cl.² C07D 487/12
U.S. Cl. 260—308 R 4 Claims

1. A compound of formula:



wherein Hal is a halogen having an atomic number up to 35,

inclusive, and its pharmacologically acceptable acid addition salts.

4,018,789

5-SUBSTITUTED-2-(2')-BENZIMIDAZOYL-FURANS

Peter Stuart Littlewood, Menston, and Alec Victor Mercer, Bramhope, both of England, assignors to Sandoz Ltd., Basel, Switzerland

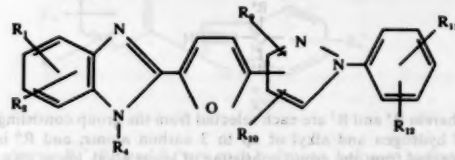
Filed May 19, 1975, Ser. No. 578,839

Claims priority, application United Kingdom, May 23, 1974, 23015/74; Nov. 15, 1974, 49461/74; Dec. 17, 1974, 54386/74

Int. Cl.² C07D *405/14*

U.S. Cl. 260—309.2 **30 Claims**

1. A compound useful as an optical brightening agent of the formula:



in which the 1-phenyl-pyrazolyl ring is bound at its 3- or 5-position to the furan ring and in which

R_1 R_2, independently, signify hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, chlorine, fluorine or C_{1-4}alkoxy-carbonyl,

R_4 signifies hydrogen; phenyl; unsubstituted C_{1-4}alkyl or C_{1-4}alkyl substituted by a substituent selected from hydroxy, cyano, amino-carbonyl, phenyl, C_{2-4}alkenyl, carboxy, C_{1-4}alkoxy-carbonyl, C_{1-4}alkoxy-(C_{1-4})-alkoxy-carbonyl, -$CONHR_{18}$ and -$CONR_{19}R_{20}$,

R_{18} signifies C_{1-4}alkyl, unsubstituted or substituted by a di-(C_{1-4})-alkylamino group,

either R_{19} and R_{20}, independently, have one of the significances of R_{18}, or are joined to form, with the nitrogen atom, a piperidino ring,

either R_9 and R_{10}, independently, signify hydrogen, C_{1-4}alkyl or phenyl, provided both do not simultaneously signify phenyl,

one of R_9 and R_{10} signifies a 4-bromo- or 4-chlorosubstituent, the other being as defined above,

R_{11} and R_{12}, independently, signify hydrogen, C_{1-4}-alkyl, C_{1-4}alkoxy, chlorine, fluorine, cyano, C_{1-4}alkoxycarbonyl, -$CONR_{14}R_{15}$, -$SO_2NR_{14}R_{15}$, -SO_2R_{16} or -SO_3M, with the proviso that R_{11} and R_{12} do not both simultaneously signify groups selected from cyano, C_{1-4}alkoxy carbonyl -$CONR_{14}R_{15}$, -$SO_2NR_{14}R_{15}$ and -SO_2R_{16},

either R_{14} and R_{15}, independently, signify hydrogen, unsubstituted C_{1-4}alkyl, or C_{1-4}alkyl substituted by a substituent selected from hydroxy, cyano and aminocarbonyl,

or R_{14} and R_{15}, together with the nitrogen atom to which they are attached, signify a piperidino ring

R_{16} signifies C_{1-4}alkyl, and M signifies hydrogen or a non-chromophoric cation;

in free base, acid addition or quaternary ammonium salt form.

4,018,790

SUBSTITUTED 1-SULFONYLBENZIMIDAZOLES

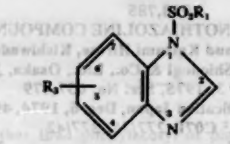
Charles J. Paget, Indianapolis, and James H. Wikel, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 574,202, May 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 484,841, July 1, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,942

Int. Cl.² C07D *235/30*

U.S. Cl. 260—309.2 **23 Claims**

1. A compound of the formula



wherein

R_1 is R_4R_5NH-, wherein R_4 and R_5 are independently C_1-C_3 alkyl and when taken together with the nitrogen atom to which they are attached, are pyrrolidino, piperidino or morpholino;

R_2 is hydrogen, formyl, acetyl or propionyl;

R_3 is C_1-C_8 alkoxycarbonyl, allyloxycarbonyl, propargyloxycarbonyl, (C_3-C_7 cycloalkyl)oxycarbonyl, (C_3-C_7 cycloalkyl)methyloxycarbonyl, 1-(C_5-C_7 cycloalkyl) ethyloxycarbonyl, benzyloxycarbonyl, α-methylbenzyloxycarbonyl, phenoxycarbonyl, hydrazinocarbonyl, carboxy, carboxamido, N-(C_1-C_4 alkyl)carboxamido, N-(C_1-C_4 alkoxy)carboxamido or cyano; and R_3 is at the 5 or 6 position.

4,018,791

PROCESS FOR THE PREPARATION OF HIGHLY PURE HALOGENATED PHTHALOCYANINE PIGMENT

Ernst Spietschka, Oberauroff, Taunus; Siegfried Schiessler, and Wolfgang Tronich, both of Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt (Main), Germany

Filed Dec. 21, 1973, Ser. No. 427,315

Claims priority, application Germany, Dec. 22, 1972, 2262972

Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **2 Claims**

1. A process for the preparaton of a highly pure, acid-stable highly halogenated copper phthalocyanine pigment which consists of the steps of: converting the crude, highly halogenated copper phthalocyanine by means of concentrated sulfuric acid or oleum into the sulfate, isolating the sulfate, hydrolizing the sulfate, isolating the highly halogenated copperphthalocyanine and grinding it in a mixture of water and an alcohol having from 4 to 6 carbon atoms.

4,018,792

5-CYANO-THIOPHEN-2-ALDEHYDE-ISOTHIOSEMICARBAZONES AND PROCESS FOR PREPARING THEM

Erhardt Winkelmann, and Heinrich Rolly, both of Kelkheim, Taunus, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 24, 1975, Ser. No. 552,211

Claims priority, application Germany, Feb. 26, 1974, 2409190

Int. Cl.² C07D *333/00*

U.S. Cl. 260—329 S **1 Claim**

1. 5-cyano-thiophen-2-aldehyde-S-methyl-isothiosemicarbazone, or a salt thereof with a physiologically tolerable acid.

4,018,793

BENZO (B) THIOPHENE DERIVATIVES

Peter Johannes Stoss, Wildtal; Manfred Franz Reinhold Herrmann, Gundelfingen, and Gerhard Satzinger, Denzlingen, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

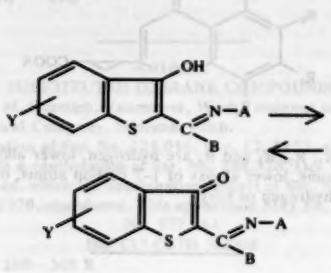
Division of Ser. No. 566,469, April 9, 1975, Pat. No. 3,971,814, which is a division of Ser. No. 419,305, Nov. 27, 1973, Pat. No. 3,907,826. This application May 12, 1976, Ser. No. 685,600

Claims priority, application Germany, Nov. 27, 1972, 2258036

Int. Cl.² C07D *333/66*

U.S. Cl. 260—330.5 8 Claims

1. A compound of the formula:



wherein

Y is hydrogen;

A is hydrogen;

B is a radical of the formula —O—R_1 wherein R_1 is

$CH_2CH_2OC_6H_5$;

$CH_2C_6H_5$; and

$CH_2CH_2C_6H_5$.

4,018,794

SULFAMYLBENZOIC ACID DERIVATIVES

Peter Werner Feit, Gentofte, and Ole Bent Tvaermose Nielsen, Vanlose, both of Denmark, assignors to Leo Pharmaceutical Products Ltd. and A/S Lovens Kemiske Fabrik Produktionsaktieselskab, both of Ballerup, Denmark

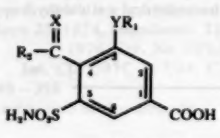
Division of Ser. No. 349,826, April 10, 1973, Pat. No. 3,897,476. This application Feb. 19, 1975, Ser. No. 551,147

Claims priority, application United Kingdom, Apr. 28, 1972, 19959/72; Nov. 16, 1972, 53043/72

Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 A 5 Claims

1. A compound selected from the group of compounds of formula I



I

in which

R_1 is selected from the group consisting of methyl and ethyl radicals monosubstituted with thienyl;

R_2 stands for a phenyl radical, optionally being substituted with a member selected from the group consisting of halogen, lower alkyl, hydroxy and lower alkoxy;

Y stands for O;

X stands for a member selected from the group consisting of O and H_2; and pharmaceutically acceptable, non-toxic salts of the carboxylic acid of formula I.

4,018,795

SANDWICH TYPE CHEMICAL COMPOUNDS

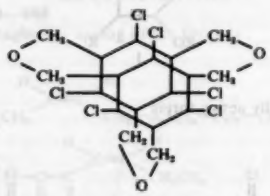
Earl Dan Flickinger, El Dorado, and Charles Merlyn Buess, Wichita, both of Kans., assignors to Skelly Oil Company, Tulsa, Okla.

Division of Ser. No. 521,256, Nov. 6, 1974, Pat. No. 3,953,426, which is a division of Ser. No. 359,126, May 10, 1973, Pat. No. 3,860,610, which is a continuation of Ser. No. 68,047, Aug. 28, 1970, abandoned, which is a division of Ser. No. 706,663, Feb. 19, 1968, Pat. No. 3,577,431, which is a continuation-in-part of Ser. No. 554,651, June 2, 1966, abandoned. This application July 16, 1975, Ser. No. 596,110

Int. Cl.² C07D *319/08*

U.S. Cl. 260—340.3 1 Claim

1. A new composition of matter having two ring nuclei composed of six carbon atoms essentially superimposed in fixed parallel planes with respect to each other and having the formula:



4,018,796

MONOMETHINE DYESTUFFS

Horst Harnisch, Cologne-Buchheim, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

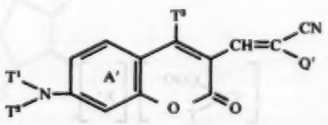
Filed Mar. 17, 1975, Ser. No. 558,647

Claims priority, application Germany, Mar. 20, 1974, 2413371

Int. Cl.² C07D *311/06*

U.S. Cl. 260—343.2 R 5 Claims

1. Monomethine dyestuff of the general formula



wherein

T^1 and T^2 independently of one another are unsubstituted C_1–C_5-alkyl uninterrupted or interrupted by —O—; C_1–C_4-alkyl monosubstituted or disubstituted by hydroxyl or chlorine; C_1–C_4 alkyl monosubstituted by bromine, nitrile, C_1–C_4-alkoxycarbonyl, aminocarbonyl, phenoxy, benzyloxy, cyclohexyloxy, cyclohexyl, C_1–C_4-alkoxycarbonyloxy, C_1–C_4-alkylcarbonyloxy, acetylamino, C_1–C_4-alkylsulphonylamino, aminocarbonyloxy, di-(C_1–C_4-alkyl) amino, carboxyl or sulpho; cyclohexyl; phenyl-C_1–C_3-alkyl; hydrogen; or C_1–C_4-alkyl uninterrupted or interrupted by —O— and substituted by benzyloxycarbonyl, phenoxycarbonyl, phenoxy substituted by 1–5 chlorine atoms, C_1–C_4-alkylsulphonyl, benzylsulphonyl, phenylsulphonyl, benzylcarbonyloxy, benzoyloxy, C_1–C_4-alkoxycarbonyl-benzoyloxy, phenoxycarbonyloxy, tri-(C_1–C_4-alkyl)ammonium, benzoylamino, phenylaminocarbonylamino, phenylsulphonylamino or toluenesulphonylamino;

T^3 is hydrogen or methyl;

Q′ is CN or COOR; and

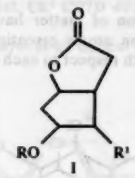
the ring A′ is unsubstituted or substituted by methoxy, methyl or chloromethyl.

4,018,797
INTERMEDIATES FOR PROSTAGLANDINS

Francis Johnson, Setauket, N.Y.; Kenneth G. Paul, West Newton, Mass., and Duccio Favara, Como, Italy, assignors to The Dow Chemical Company, Midland, Mich.

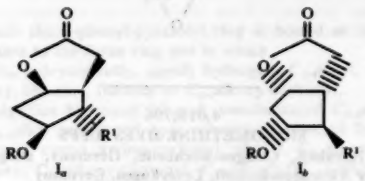
Continuation-in-part of Ser. No. 447,103, March 1, 1974, abandoned. This application Feb. 18, 1975, Ser. No. 550,402
Int. Cl.² C07D 307/93
U.S. Cl. 260—343.3 R 2 Claims

1. A process for preparing a compound of the group having the formula

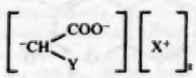


I

and its optically active forms



wherein:
R represents acetyl and R^1 represents a CH_2OH group, which comprises (1) reacting at about −30° to about +30° C substantially one molar proportion of 1-2-acetoxysuccinoyl chloride with substantially five molar proportions of a salt of the formulas



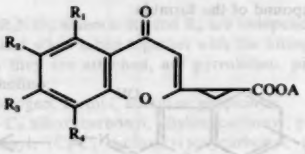
wherein Y represents a $COOR^2$ group wherein R^2 is lower alkyl and X is an alkali metal cation selected from $MgBr^+$, $MgCl^+$ and MgI^+ whereby a 3,6-dioxo-4-acetoxyoctanedioic acid ester is formed, (2) cyclizing the last named by heating it in an aqueous solution at a pH of about 5 to 11 to give a 5-acetoxy-2-carbo-(lower alkoxy)-3-oxo-1-cyclopenteneacetic acid ester, (3) (a) hydrogenating the cyclopentene ring to cyclopentane with hydrogen in the presence of a noble metal or a noble metal oxide hydrogenation catalyst, (3) (b) reducing the keto group to a hydroxy group with sodium borohydride in an aqueous solution buffered to a pH of about 3 to about 9 to give the methyl ester of 3-acetoxy-2-carbomethoxy-3-hydroxycyclopentaneacetic acid, (4) cyclizing the so-obtained acyloxycyclopentaneacetic acid derivative by alkaline hydrolysis and acylating the hydroxy group with acetyl chloride to the corresponding lactone of preceding formula I, Ia or Ib wherein R^1 is a carboxy group and R is acetyl, (5) converting the carboxylic group to a mixed anhydride group by reaction with a lower alkyl chlorocarbonate or to an acid chloride group by reaction with $SOCl_2$ and (6) reducing the mixed anhydride group or the acid chloride group with excess sodium borohydride to give the gamma lactone of 3-acetoxy-2-hydroxymethyl-5-hydroxycyclopentane-acetic acid.

4,018,798
SUBSTITUTED (4-OXO-4H-1-BENZOPYRAN-2-YL)CYCLOPROPANE CARBOXYLIC ACIDS AND ESTERS

Marvin P. Cohen, New Milford; John Shavel, Jr., Mendham, and Max Von Strandtmann, Rockaway Township, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Nov. 20, 1975, Ser. No. 633,745
Int. Cl.² C07D 311/02
U.S. Cl. 260—345.2 7 Claims

1. A compound of the formula:



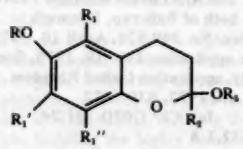
wherein R_1, R_2, R_3 and R_4 are hydrogen, lower alkyl of 1–7 carbon atoms, lower alkoxy of 1–7 carbon atoms, or phenyl, and A is hydrogen or ethyl.

4,018,799
ANTIOXIDANT CHROMAN COMPOUNDS

John William Scott, Upper Montclair; David Richard Parrish, Glen Ridge, and Gabriel Saucy, Essex Fells, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 417,465, Nov. 19, 1973, Pat. No. 3,947,473, which is a continuation-in-part of Ser. No. 317,566, Dec. 22, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,611
Int. Cl.² C07D 311/20
U.S. Cl. 260—345.5 3 Claims

1. A compound of the formula



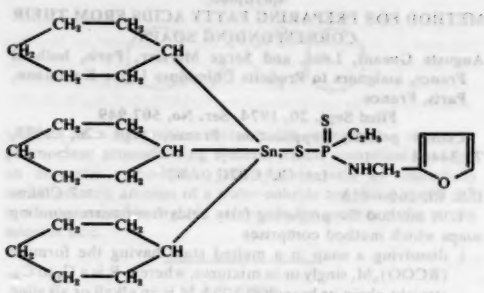
wherein R_1, R'_1 and R_1'' are hydrogen or lower alkyl; R_2 is hydrogen, lower alkyl or phenyl; R is hydrogen, lower alkanoyl, benzoyl, benzyl, benzylhydryl or tetrahydropyranyl; and R_5 is lower alkyl.

4,018,800
ORGANOTIN MITICIDAL AND INSECTICIDAL COMPOUNDS

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 466,928, May 6, 1975, Pat. No. 3,947,461, which is a division of Ser. No. 304,871, Oct. 19, 1972, Pat. No. 3,832,370. This application Jan. 5, 1976, Ser. No. 646,681
Int. Cl.² C07D 307/64
U.S. Cl. 260—347.2 1 Claim

1. A compound of the formula



4,018,801
SUBSTITUTED OXIRANE COMPOUNDS

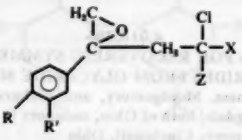
Thomas M. Ozretich, Vancouver, Wash., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 424,016, Dec. 12, 1973, abandoned, which is a continuation of Ser. No. 294,328, Oct. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 61,846, Aug. 6, 1970, abandoned. This application May 14, 1975, Ser. No. 577,264

Int. Cl.² C07D *303/08*

U.S. Cl. 260—348 R **15 Claims**

1. A compound having the following structure



wherein X represents halogen; Z represents hydrogen, halogen, cyano or lower alkyl; R and R′ each independently represent hydrogen, halogen, cyano, nitro, lower alkoxy, trifluoromethyl, benzyloxy or lower alkyl, with the proviso that when R′ is hydrogen, R is cyano, nitro, trifluoromethyl, or benzyloxy and when R is hydrogen R′ is halogen, cyano, nitro, trifluoromethyl or benzyloxy.

4,018,802
9-THIA- AND OXOTHIA- AND 9-DIOXOTHIA-11,12-SECO-PROSTAGLANDINS AND PROCESSES

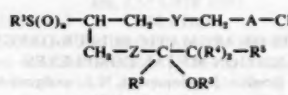
Edward J. Cragoe, Jr.; John B. Bicking, and Robert L. Smith, all of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 566,566, April 9, 1975, abandoned, which is a continuation-in-part of Ser. No. 483,178, June 25, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,006

Int. Cl.² C07C *147/14;* **C11D** *1/28*

U.S. Cl. 260—399 **38 Claims**

1. The compound of the formula



wherein

R is carboxy or a carboxy salt;

A is methylene;

Y is selected from the group consisting of ethylene, vinylene, and ethynylene;

R^1 is selected from the group consisting of methyl, ethyl, 2-hydroxyethyl, 2-(loweralkoxy)ethyl, and vinyl;

n is 0, 1, or 2;

Z is selected from the group consisting of ethylene, vinylene, and ethynylene,

R^2 is hydrogen or methyl;

R^3 is hydrogen;

R^4 is hydrogen or methyl;

R^5 is alkyl, branched chain alkyl of 3–6 carbon atoms, vinyl, or OR^{5a} wherein R^{5a} is alkyl or branched alkyl of 2–5 carbon atoms.

4,018,803
13,14-DIDEHYDRO-PG$_2$ COMPOUNDS

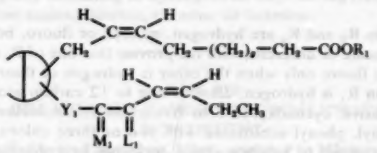
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 13, 1976, Ser. No. 657,738

Int. Cl.² C07C *177/00*

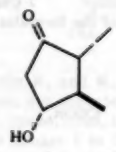
U.S. Cl. 260—408 **109 Claims**

1. A prostaglandin analog of the formula

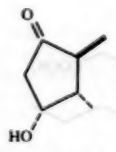


wherein

is



or



;

wherein Y_1 is -C ≡ C-;

wherein g is one, 2, or 3;

wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso

that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, phenyl, phenyl substituted with two or three chloro, or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

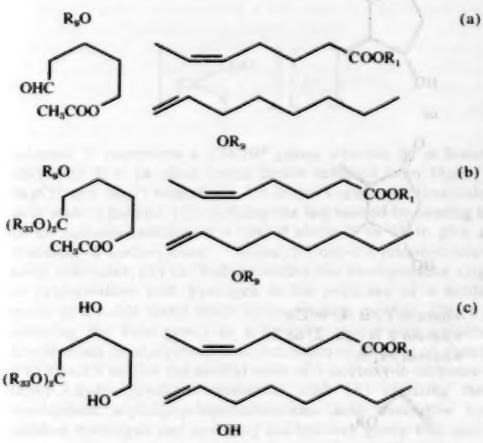
4,018,804

INTERMEDIATE FOR SYNTHESIS OF THROMBOXANE B_2

William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 14, 1976, Ser. No. 676,894
Int. Cl.² C11C 3/02; C09F 5/00
U.S. Cl. 260—410.9 R **7 Claims**

1. A thromboxane intermediate of one of the formulas



wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one or 2 chloro, fluoro, or alkyl of one to 4 carbon atoms, inclusive;
wherein R_9 is an acyl protecting group; and
wherein R_{33} is alkyl of one to 5 carbon atoms, inclusive.

4,018,805

METHOD FOR PREPARING FATTY ACIDS FROM THEIR CORRESPONDING SOAPS

Auguste Gueant, Lens, and Serge Mercier, Paris, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Sept. 20, 1974, Ser. No. 507,949
Claims priority, application France, Sept. 26, 1973, 73.34464
Int. Cl.² C07C 51/02
U.S. Cl. 260—413 **7 Claims**

1. A method for preparing fatty acids from corresponding soaps which method comprises
   i. dissolving a soap in a melted state having the formula $(RCOO)_nM$, singly or in mixtures, wherein R is a C_4 to C_{30} straight-chain or branched alkyl, M is an alkali or alkaline earth metal, and n corresponds to the valence of M in at least one C_8 to C_{31} fatty acid in a melted state in the absence of oxygen and at a temperature of between 50° to 150° C. to form a liquid solution of soap in fatty acid, the weight ratio of soap to fatty acid being from about 2/1 to 0.2/1.
   ii. contacting said solution with an aqueous solution containing an amount of strong mineral acid at least stoichiometrically equivalent to the soap and
   iii. allowing the cations of soap and strong acid to exchange phases, the amount of water being sufficient to dissolve substantially all of the mineral salt thus formed.

4,018,806

PROCESS FOR RECOVERING SYMMETRICAL DIGLYCERIDES FROM GLYCERIDE MIXTURES

Glen Reid Wyness, Montgomery, and Richard Worthington Lodge, Springdale, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 6, 1975, Ser. No. 619,741
Int. Cl.² C11B 7/00; C07C 69/30
U.S. Cl. 260—428.5 **12 Claims**

1. A process for recovering 1,3-digylceride from a glyceride mixture comprising from 5% to 60% triglyceride, from 15% to 70% 1,3-diglyceride, from 1% to 40% 1,2-diglyceride and from 8% to 50% monoglyceride which comprises: forming a solution of a glyceride mixture comprising from 5% to 60% triglyceride, from 15% to 70% 1,3-diglyceride, from 1% to 40% 1,2-diglyceride and from 8% to 50% monoglyceride, the acyl groups of said glycerides having from 12 to 22 carbon atoms and a non-polar hydrocarbon solvent and polar organic solvent, in a ratio of non-polar hydrocarbon solvent to polar organic solvent of from 2:1 to 20:1, **said polar organic solvent being sufficiently polar as to dissolve the monoglyceride content of said glyceride mixture; inducing and maintaining crystallization of solid** 1,3-diglyceride from the solution while maintaining the temperature of the solution below the saturation temperature of the 1,3-diglyceride and above the saturation temperature of the remaining components of the glyceride mixture; and recovering solid highly pure 1,3-diglyceride.

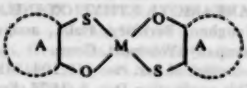
4,018,807

SYNTHESIS OF AROMATIC SULFUR-OXYGEN TRANSITION METAL COMPLEXES

Houston George Brooks, Jr., Somerset, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed July 25, 1975, Ser. No. 599,225
Int. Cl.² C07F 15/04
U.S. Cl. 260—439 R **9 Claims**

1. A method for the preparation of a transition metal complex of an aromatic o-hydroxymercaptan represented by the formula:



wherein M is a transition metal and A represents a mono- or polynuclear aromatic ring system, which comprises reacting an aromatic ortho-hydroxythiocyanate with an essentially stoichiometric amount of a water-soluble transition metal salt in a water-miscible organic solvent in the presence of a strong mineral acid.

4,018,808

HYDRAZINO NICKEL THIO-BIS-PHENOLATES AND POLYOLEFINS STABILIZED THEREBY AGAINST THE EFFECTS OF HEAT AND LIGHT

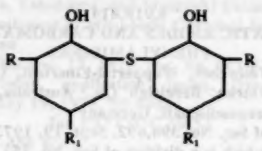
Elmar Harry Jancis, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Division of Ser. No. 439,801, Feb. 6, 1974, Pat. No. 3,925,308. This application July 1, 1975, Ser. No. 592,142

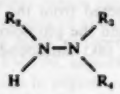
Int. Cl.² C07F *15/04*

U.S. Cl. 260—439 R **5 Claims**

1. Hydrazino nickel thio-bis-phenolates which are the hydrazine complexes which of nickel thio-bis-phenolates, where the thio-bis-phenol is of the formula



where R is selected from the group consisting of hydrogen, normal alkyl or normal alkenyl, and R_1 is selected from the group consisting of normal, secondary, tertiary and cyclic alkyl groups, and the hydrazine is of the formula



where R_2, R_3 and R_4 are independently chosen from the group consisting of hydrogen and primary, secondary and tertiary alkyl groups consisting of 1 to 8 carbon atoms.

4,018,809

SOLUTIONS OF NEW ANTIMONY COMPLEXES

Eduard Radlmann; Heinz Schaffner; Günter Lorenz, and Günther Nischk, all of Dormagen, Germany, assignors to Plumley and Tyner, Leverkusen, Germany

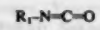
Filed Sept. 12, 1975, Ser. No. 612,712

Claims priority, application Germany, Sept. 12, 1974, 2443572

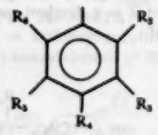
Int. Cl.² C07F *9/90*

U.S. Cl. 260—446 **8 Claims**

1. A process for the production of a solution of a substantially water-insoluble complex antimony compound in a polar organic solvent which comprises esterifying an α-hydroxy polycarboxylic acid with a polyol in a molar ratio of the carboxyl groups to the hydroxyl groups in the polyol of at least 2 : 1 and in the presence of an acid transesterification catalyst; reacting an excess of the esterification product with an antimony oxide in a polar organic solvent at a temperature in the range of from 100° to 200° C to form a clear solution still containing free carboxyl groups; and adding a monoisocyanate to the solution at a temperature below 100° C in such a quantity that the free carboxyl groups are converted into the corresponding amide groups the monoisocyanate corresponding to the general formula



in which R_1 is a straight-chain or branched alkyl group having from 1 to 20 carbon atoms, or



in which R_2, R_3, R_4, R_5 and R_6 may be the same as or different from one another and may represent a member selected from the group consisting of hydrogen, an alkyl having from 1 to 5 carbon atoms, fluorine, chlorine or bromine.

4,018,810

ORGANIC DYE HAVING FLUOROALIPHATIC SUBSTITUENT

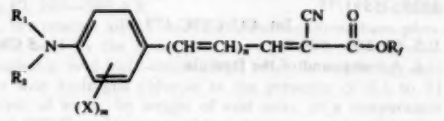
Ivan H. Skoog, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 11, 1975, Ser. No. 586,097

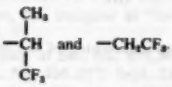
Int. Cl.² C07C *121/78*

U.S. Cl. 260—465 D **2 Claims**

1. A compound having the general formula



wherein R_1 and R_2 are hydrogen, alkyl, haloalkyl, aryl, or aralykl, n is the integer zero, 1 or 2, X is hydrogen, halogen, alkyl, cyano, nitro, alkoxy, $-SO_3H$, or carboxylic acid, and m is the integer 1 to 3, R_f is a monovalent saturated fluoroaliphatic radical selected from the group consisting of



4,018,811

3-ALKYL-2-(6-CARBOXYHEXYL)CYCLOPENTANONES AND ESTERS AND SALTS THEREOF

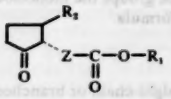
Robert Eugene Schaub, Upper Saddle River, N.J.; Karel Francis Bernady, Suffern, N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 225,680, Feb. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 95,910, Dec. 7, 1970, abandoned. This application Apr. 3, 1972, Ser. No. 240,814

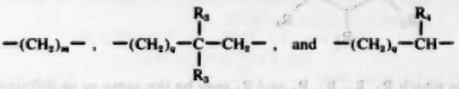
Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 K **10 Claims**

1. A compound selected from the group consisting of those of the formula:



wherein R_1 is selected from the group consisting of hydrogen and lower alkyl; R_2 is a straight chain alkyl group having from 1 to 10 carbon atoms, inclusive; and Z is a divalent radical selected from the group consisting of



wherein m is an integer from 4 to 8, inclusive, q is an integer from 3 to 5, inclusive, R_3 is lower alkyl, and R_4 is selected from the group consisting of fluoro and lower alkyl; the stereoisomers thereof; and the cationic salts thereof when R_1 is hydrogen.

4,018,812

16-METHYLENE-PROSTAGLANDIN COMPOUNDS

Masaki Hayashi; Seiji Kori, both of Takatsuki, and Hajimu Miyake, Suita, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

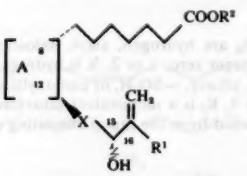
Filed May 13, 1976, Ser. No. 685,953

Claims priority, application United Kingdom, June 16, 1975, 25591/75

Int. Cl.² C07C *177/00*

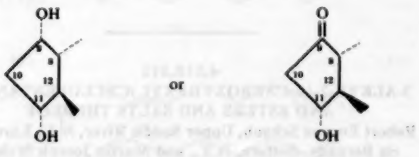
U.S. Cl. 260—468 D **5 Claims**

1. A compound of the formula:



IV

wherein A represents a grouping of the formula:



II III

, R^1 represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 6 carbon atoms, R^2 represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms, X represents trans-vinylene or ethylene, and the wavy line indicates attachment of the hydroxy radical in α- or β-configuration and cyclodextrin clathrates thereof and, when R_2 represents a hydrogen atom, non-toxic salts thereof.

4,018,813

N-CARBAMOYL ETHYL OXANILATES

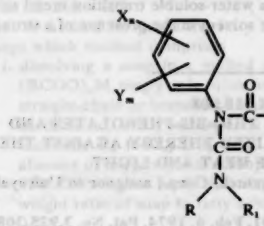
Edmund J. Gaughan, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 559,104, March 17, 1975, abandoned. This application Dec. 8, 1975, Ser. No. 638,491

Int. Cl.² C07C *127/19*

U.S. Cl. 260—471 A **10 Claims**

1. The compound having the formula



wherein X and Y are independently selected from the group consisting of chloro, bromo and trifluoromethyl; n is either 0 or 1; m is either 0 or 1; R and R_1 are independently selected from the group consisting of lower alkyl from C_1 to C_3, inclusive, and lower alkoxy from C_1 to C_3, inclusive.

4,018,814

AROMATIC AMIDES AND CARBOMATES OF PHENYLAMIDINES

Hartmund Wollweber, Wuppertal-Elberfeld, Germany, and Winfried Flucke, Beenleigh Qu., Australia, assignors to Bayer Aktiengesellschaft, Germany

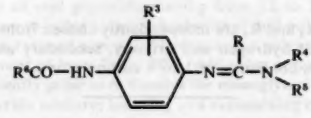
Division of Ser. No. 398,692, Sept. 19, 1973, Pat. No. 3,911,010, which is a division of Ser. No. 151,581, June 9, 1971, Pat. No. 3,818,070. This application Apr. 18, 1975, Ser. No. 569,565

Claims priority, application Germany, June 13, 1970, 2029298

Int. Cl.² C07C *101/62*; A61K *31/27*

U.S. Cl. 260—471 C **10 Claims**

1. A compound selected from the group consisting of an aminophenylamidine and the physiologically acceptable acid addition salts thereof, said aminophenylamidine having the formula:



wherein

R is alkyl of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms or cycloalkyl of 3 to 7 carbon atoms;

R^3 is hydrogen, chloro, fluoro, bromo, cyano, trifluoromethyl, alkyl of up to 4 carbon atoms, alkoxy of up to 4 carbon atoms and alkenyl of up to 4 carbon atoms;

R^4 is an aliphatic substituent of up to 4 carbon atoms selected from the group consisting of alkyl, alkenyl, alkynyl and alkoxy;

R^5 is an aliphatic substituent of up to 4 carbon atoms selected from the group consisting of alkyl or alkenyl, or cycloalkyl of 3 to 7 carbon atoms, and

R^6 is selected from the group consisting of phenyl, phenoxy, naphthyl, tetralyl, benzyl, phenethyl, benzyloxy, phenylethoxy, phenoxymethyl and phenoxymethoxy, unsubstituted or substituted with 1 to 3 members selected from the group consisting of nitro, trifluoromethyl, hydroxy, cyano, chloro, fluoro, bromo, methyl, methoxy, carbethoxy, methylsulfonyl, acetylamino, or acetyloxy.

4,018,815
PROCESS FOR THE PREPARATION OF POLYESTER POLYOLS

Herwart C. Vogt, Grosse Ile, and John T. Patton, Jr., Wyandotte, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Sept. 29, 1975, Ser. No. 617,308
Int. Cl.² C07C *69/34, 69/52*
U.S. Cl. 260—485 G 6 Claims

1. In a process for the preparation of a polyester polyol by the esterification of a polycarboxylic acid or anhydride with a polyhydric alcohol the improvement which comprises:

a. initially charging to a reactor an amount of a polycarboxylic acid or anhydride equal to between 3 to 16 weight percent in excess of stoichiometry;

b. adding to the reactor a polyhydric alcohol and heating the charge to a temperature between 130° to 240° C.;

c. removing from the reactor between 90 to 95 weight percent of the water of esterification resulting from step (b);

d. charging to the reactor an amount of polyhydric alcohol substantially equivalent in weight to the amount of water of esterification removed from step (c); and

e. continuing the esterification reaction until a polyol having an acid number of less than two is obtained.

4,018,816
PREPARATION OF METHACRYLATES

Takeru Onoda, Yokohama, and Masayuki Otake, Tokyo, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Dec. 17, 1975, Ser. No. 641,824
Claims priority, application Japan, Dec. 19, 1974, 49-146617; May 19, 1975, 50-59441
Int. Cl.² C07C *69/54*
U.S. Cl. 260—486 R 17 Claims

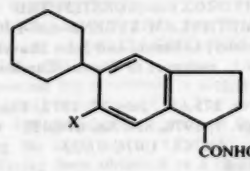
1. In a process for the preparation of a methacrylate by the vapor phase reaction of methacrylic acid with an aliphatic alcohol having 1 to 4 carbon atoms and 1 to 2 hydroxyl groups in the proportion of 0.5 – 100 moles of the aliphatic alcohol per mole of methacrylic acid, at a temperature of 160° – 360° C in the presence of a catalyst, the improvement wherein the catalyst is a solid acid silica-titania catalyst which is prepared by dissolving a silicon compound and a titanium compound in an aqueous medium in such proportions that the ratio of silicon to titanium is 0.1 – 100, adjusting the pH of the resultant aqueous solution so as to coprecipitate the silicon and the titanium components and then drying and calcining the coprecipitate to form the catalyst.

4,018,817
6-HALO-5-CYCLOHEXYLINDAN-1-CARBOHYDROXAMIC ACID

Shunsaku Noguchi; Yoshiaki Araki, both of Osaka; Masayuki Imanishi, Hyogo, and Kiyohisa Kawai, Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Nov. 30, 1973, Ser. No. 420,459
Claims priority, application Japan, Dec. 7, 1972, 47-122874
Int. Cl.² C07C *83/08;* A61K *31/165*
U.S. Cl. 260—500.5 H 2 Claims

1. A compound of the formula



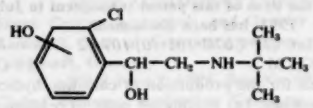
wherein X represents halogen.

4,018,818
HYDROXYL-SUBSTITUTED 2-CHLORO-α-(TERT-BUTYLAMINOMETHYL)-BENZYLALCOHOLS

Yuzuro Yamamoto, Kanazawa; Hideo Kato, Katsuyama Fukui; Sakae Kurata, Katsuyama Fukui, and Kazunori Nishide, Katsuyama Fukui, all of Japan, assignors to Hokuriku Pharmaceutical Co., Ltd., Fukui, Japan

Filed May 5, 1975, Ser. No. 575,052
Claims priority, application Japan, May 16, 1974, 49-53903
Int. Cl.² C07C *91/22*
U.S. Cl. 260—501.17 4 Claims

1. A hydroxyl-substituted 2-chloro-α-(tert-butylaminomethyl)-benzylalcohol of the general formula



(I)

and salts thereof.

4,018,819
PROCESS FOR THE MANUFACTURE OF 2-CHLOROETHANE-PHOSPHONIC ACID

Karl Rehn, Hofheim, Taunus; Otto Schaffner, Morfelden, and Gerhard Stähler, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 207,620, Dec. 13, 1971, abandoned. This application Aug. 19, 1975, Ser. No. 605,868
Claims priority, application Germany, July 9, 1971, 2134346
Int. Cl.² C07F *9/38*
U.S. Cl. 260—502.4 R 7 Claims

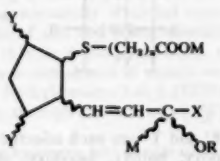
1. In a process for the manufacture of 2-chloroethane-phosphonic acid by the hydrolytic cleavage of 2-chloroethane-phosphonic acid-bis(2-chloroethyl) ester by contacting said ester with hydrogen chloride in the presence of 0.1 to 31 percent of water, by weight of said ester, at a temperature above 100° C. and under an elevated pressure and maintaining an elevated pressure during the reaction by adding gaseous hydrogen chloride, the improvement which comprises distilling off during the reaction to 1,2-dichloroethane formed by the reaction.

4,018,820
CHEMICAL SYNTHESIS

Josef Fried, Chicago, Ill., assignor to The University of Chicago, Chicago, Ill.

Continuation-in-part of Ser. No. 274,365, July 24, 1972, abandoned, and Ser. No. 400,297, Sept. 24, 1973, abandoned, which is a continuation of Ser. No. 361,664, May 18, 1973, abandoned, which is a continuation of Ser. No. 53,663, July 9, 1970, abandoned. This application Sept. 5, 1974, Ser. No. 503,215
Int. Cl.² C07C *177/00*
U.S. Cl. 260—514 D 4 Claims

1. A compound of the formula:



wherein

M is H, or lower alkyl;

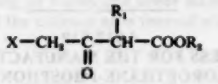
Y is OH, acyloxy, or lower alkoxy;
X is lower alkyl;
R is H, acyl, or lower alkyl;
n is an integer from 2 to 5; and wherein the acyl radicals are derived from hydrocarbon carboxylic acids of 12 carbon atoms or less.

4,018,821
PROCESS FOR THE PRODUCTION OF CARNITINE

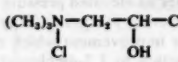
Leander Tenud, Visp, Switzerland, assignor to Lonza Ltd., Gampel, Switzerland

Filed Sept. 25, 1975, Ser. No. 616,849
Claims priority, application Switzerland, Sept. 25, 1974, 012971/74
The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.
Int. Cl.² C07C *101/10, 101/12*
U.S. Cl. 260—534 M **14 Claims**

1. The process for the production of carnitine hydrochloride which comprises: (a) placing an ester of γ-haloacetoacetic acid having the formula:



wherein R_1 is hydrogen, R_2 is a lower alkyl group having 1 to 10 carbon atoms and X is a halogen atom selected from the group consisting of chlorine or bromine, in an aqueous solution of excess trimethyl amine held at a temperature between 0° and 50° C., a reaction resulting between said ester and said amine; (b) distilling off the excess trimethyl amine; (c) adjusting the pH of the solution to between 4and 8, (3-carbalkoxy-2-oxopropyl)-trimethyl ammonium halide resulting; (d) catalytically hydrogenating said (3-carbalkoxy-2-oxopropyl)-trimethyl ammonium halide without isolating said halide from solution, a carnitine ester resulting; and (e) converting said carnitine ester by means of aqueous hydrochloric acid into said carnitine hydrochloride, which has the formula:



4,018,822
THIOAMINOPHOSPHAZENES

Vijay Ratna Sharma, and John Anthony Taylor, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed July 29, 1975, Ser. No. 600,190
Claims priority, application United Kingdom, Sept. 9, 1974, 39264/74
Int. Cl.² C07F *9/22, 9/23, 9/24*
U.S. Cl. 260—551 P **6 Claims**

1. A thioaminophosphazene of the formula

wherein *n* is 1 to 5,

A, if present, Y^1 and Y^2 are each selected from methoxy, ethoxy, propoxy, butoxy, hexyloxy, phenoxy, cresyl, xylyloxy, chlorophenoxy, dimethylamino, or groups of the formula $—NHR^{10}$ where R^{10} is selected from phenyl, methylphenyl, methoxyphenyl, cyclohexyl, methyl or two of the groups $—NHR^{10}$ together are 1,2-phenylenediamino;

B is selected from benzenesulphonyl, toluenesulphonyl, methane sulphonyl, naphthalene sulphonyl, formyl, acetyl or benzoyl, and

at least one of the groups A, Y^1 and Y^2 are of the formula

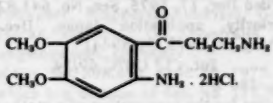
where R^{10} is defined above and R^2 is selected from methyl, ethyl, isopropyl, isobutyl, cyclohexyl, sec-butyl, phenyl or methoxyphenyl.

4,018,823
4′,5′-DIMETHOXY-2′,3-DIAMINOPROPIOPHENONE DIHYDROCHLORIDE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,531
Int. Cl.² C07C *97/10*
U.S. Cl. 260—570.5 C **1 Claim**

1. The compound of the formula:



4,018,824
1-ARYLOXY-3-AMINOPROPANE DERIVATIVES

Kunio Tsukamoto, Tokyo; Yasushi Suzuki, Yokohama; Akihiro Izumi, Kawasaki, and Yoshio Hiramatsu, Tokyo, all of Japan, assignors to Teikoku Hormone Mfg. Co., Ltd., Tokyo, Japan

Division of Ser. No. 92,252, Nov. 23, 1970. This application Sept. 20, 1974, Ser. No. 507,793
Claims priority, application Japan, Nov. 28, 1969, 44-95027; Mar. 30, 1970, 45-26548; Mar. 30, 1970, 45-26549; July 21, 1970, 45-63377; Oct. 15, 1970, 45-90429; Nov. 13, 1970, 45-99733
Int. Cl.² C07C *93/06*
U.S. Cl. 260—570.7 **1 Claim**

1. 2-Benzyloxy-1-(2′, 3′-dimethylphenyloxy)-3-tert.-butylamino-propane.

4,018,825
5-HYDROXY-α-(SUBSTITUTED AMINOMETHYL)-M-XYLENE-α,α′-DIOLS

Charles F. Schwender, Lebanon, and John Shavel, Jr., Mendham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 275,611, July 27, 1972. This application Apr. 7, 1976, Ser. No. 674,452
Int. Cl.² C07C *91/22*
U.S. Cl. 260—570.6 **1 Claim**

1. 5-benzyloxy-α[(-butylamino)methyl]-m-xylene-α, α′-diol.

4,018,826

PROCESS FOR PREPARING POLYVINYLAMINE AND SALTS THEREOF

Richard D. Gless, Jr., Oakland; Daniel J. Dawson, Los Altos, and Robert E. Wingard, Palo Alto, all of Calif., assignors to Dynapol Corporation, Palo Alto, Calif.

Filed Nov. 4, 1974, Ser. No. 520,530

Int. Cl.² A23L *1/27*; C07C *87/24*; C08F *120/52*, *126/02*

U.S. Cl. 260—583 P 6 Claims

1. A process for preparing poly(vinylamine) salt which comprises the steps of:

A. reacting at a temperature of from 20° C to 100° C acetaldehyde with from two to four stoichiometric equivalents of acetamide in the presence of from 0.001 to 1.0 mole per mole of acetamide of an aqueous mineral acid catalyst to yield a vinylacetamide and ethylidene-bis-acetamide containing reaction product,

B. neutralizing the aqueous mineral acid catalyst and heating the vinylacetamide and ethylidene-bis-acetamide containing reaction product to 150° C to 250° C for from 0.2 to 5 hours in the presence of an inorganic nonacidic silicious oxide surface catalyst to yield a decomposition product, said catalyst having a surface area of at least about 1 m^2/g,

C. separating vinylacetamide from said decomposition product by vacuum volatilization,

D. contacting with vinylacetamide at a concentration of from 10% to 50% by weight in a reaction medium selected from polar hydrogen bonding liquids and nonpolar liquids with from 0.1 to 20 grams per 100 grams of vinylacetamide of a free radical initiator polymerization catalyst at a temperature of from 25° C to 125° C for from 4 to 8 hours to yield poly(vinylacetamide),

E. hydrolyzing said poly(vinylacetamide) by contacting it with from 1.05 to 3 equivalents of a mineral acid per equivalent of poly(vinylacetamide) at a temperature of from 25° C to 125° C for from 4 to 8 hours to yield the poly(vinylamine) salt of said mineral acid, and

F. precipitating and recovering said poly(vinylamine) salt.

4,018,827

PROCESS FOR THE PREPARATION OF CYCLOALKANE-1,2-DIONES

Durvasula V. Rao, Cheshire, and Fred A. Stuber, North Haven, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 25, 1976, Ser. No. 661,285

Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 P 12 Claims

1. A process for the autoxidation of a cycloalkanone to the corresponding cycloalkane-1,2-dione which process comprises reacting said cycloalkanone with oxygen in the presence of (i) from 1 to 2 mole, per mole of cycloalkanone, of a base selected from the class consisting of alkali metal hydroxides and alkali metal alkoxides and (ii) an organic polar solvent at a temperature not exceeding about −20° C.

4,018,828

PROCESS FOR RECOVERING DIALKYLARYLKETONE

Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed May 27, 1975, Ser. No. 581,288

Int. Cl.² C07C *49/76*

U.S. Cl. 260—591 7 Claims

1. A process for recovering a dialkylarylketone selected from the group consisting of 3,4,3′,4′-tetramethylbenzophenone and 4,4′-dimethylbenzophenone from an oily mixture containing the same and a 1,1-diaryl-2-nitroethylene, said mixture having been obtained as a result of the nitric acid oxidation of 1,1-bis (3,4-dimethylphenyl)ethane and 1,1-bis(4-methylphenyl)ethane, respectively, which comprises adding a base selected from the group consisting of sodium hydroxide, potassium hydroxide, calcium hydroxide, ammonia, ammonium hydroxide, sodium amide, potassium amide and potassium t-butoxide to said mixture until solidification of said dialkylarylketone occurs, the amount of said base employed ranging from about 0.5 to about 20 weight percent based on said dialkylarylketone, and then recovering said solid dialkylarylketone by separating the latter from a solvent solution of said 1,1-diaryl-2-nitroethylene, the solvent used in said solvent solution selected from the group consisting of hydrocarbons, alcohols, ketones, esters and ethers.

4,018,829

METHOD FOR MAKING α-HYDROXY-ISOBUTYRAMIDE FROM ACETONE CYANOHYDRIN

Wilhelm Gruber, Darmstadt, and Guenter Schroeder, Ober-Ramstadt, both of Germany, assignors to Rohm GmbH, Darmstadt, Germany

Filed June 2, 1976, Ser. No. 692,109

Claims priority, application Germany, June 18, 1975, 2527120

Int. Cl.² C07C *102/08*

U.S. Cl. 260—561 B 4 Claims

1. In a method for makin α-hydroxy-isobutyramide by the hydration of acetone cyanohydrin in the presence of manganese dioxide as a catalyst, the improvement wherein acetone is added to the reaction mixture.

4,018,830

PHENYLTHIOARALKYLAMINES

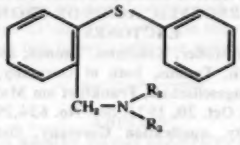
Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 860,076, Sept. 22, 1969, abandoned. This application Nov. 25, 1974, Ser. No. 526,984

Int. Cl.² C07C *97/28*

U.S. Cl. 260—570.9 3 Claims

1. Compounds having the formula



wherein R_2 and R_3 are independently selected from hydrogen, C_1–C_6 alkyl, C_1–C_6 alkenyl and C_1–C_6 alkynyl.

4,018,831

PRODUCTION OF 2-ETHYL HEXANAL

Emmerson Bowes, Glassboro, N.J., and Robert E. Chute, Erie, Pa., assignors to Mallinckrodt, Inc., St. Louis, Mo.

Filed Sept. 11, 1975, Ser. No. 612,679

Int. Cl.² C07C *47/02*

U.S. Cl. 260—601 R 2 Claims

1. A process for the production of 2-ethyl hexanal without substantial simultaneous production of 2-ethyl hexanol which consists essentially of:

A. providing a bed of particulate hydrogenation catalyst consisting essentially of nickel coated on alumina, the D/A ratio of said bed being between about 1:1 and 6:1 wherein D is the depth of the bed in centimeters and A is the cross-sectional area in square centimeters,

B. passing 2-ethyl-hexene-2-al-1 (TEH) in the liquid phase upwardly through said bed at a LHSV from about 0.5 to 3,

C. injecting hydrogen into stream of TEH entering said bed at the base thereof,

D. maintaining the temperature of said bed at about 90° – 180° C,

E. maintaining the fluid in contact with said bed at a pressure between about 7 to 35 Kgm/cm²,
F. removing a liquid stream overhead from said bed, and
G. recovering 2-ethyl hexanal from said overhead effluent stream.

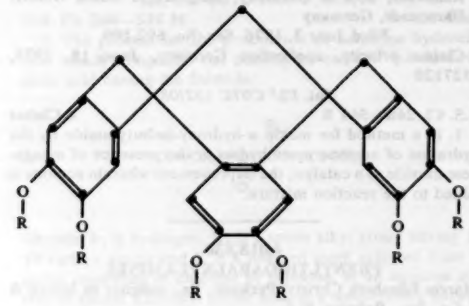
4,018,832

NOVEL COMPLEXING AGENTS DERIVED FROM CYCLOTRIVERATRYLENE

John A. Hyatt, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 14, 1976, Ser. No. 705,193
Int. Cl.² C07C *43/26*
U.S. Cl. 260—613 B **5 Claims**

1. A compound having the formula



wherein R is $-(CH_2-CH_2-O)_n-R^1$, *n* is an integer of 1 to 5 and R^1 is alkyl having 1 to 6 carbon atoms.

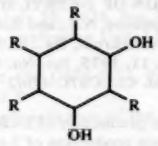
4,018,833

PREPARING RESORCINOLS FROM δ-KETOCARBOXYLIC ACIDS OR FROM THEIR LACTONES

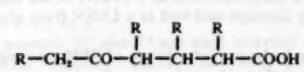
Werner Heinrich Müller, Kelkheim, Taunus, and Hans Fernholz, Fischbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 20, 1975, Ser. No. 624,290
Claims priority, application Germany, Oct. 22, 1974, 2450086
Int. Cl.² C07C *37/00*
U.S. Cl. 260—621 R **12 Claims**

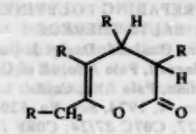
1. A process for the preparation of resorcinol of the formula



wherein each of the R substituents may be the same or different and is a member selected from the group consisting of H and alkyl, cyclo alkyl and aryl having up to 12 carbon atoms, which comprises contacting a ketocarboxylic acid of the formula



or its lactone of the formula



wherein R has the aforesaid meaning, with a dehydrogenation cayaltyst selected from the group consisting of a metal or a compound of a metal from the eighth or first subgroup of the periodic table and a carrier therefore, said contacting being carried out in a gaseous phase and at a temperature of 150° to 500° C,
dehydrogenating said ketocarboxylic acid or said lactone to obtain said resorcinol, cooling and condensing said gas phase and recovering said resorcinol from said condensate.

4,018,834

HYDROCARBONYLATION OVER IRON ON SUPPORT HAVING SILICA ALUMINA DISPERSED IN A SEPARATE PHASE ALUMINA MATRIX

Jin Sun Yoo, South Holland, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 424,488, Dec. 13, 1973, abandoned, which is a continuation of Ser. No. 30,275, April 20, 1970, abandoned. This application Feb. 13, 1976, Ser. No. 657,814
Int. Cl.² C07C *45/04*
U.S. Cl. 260—632 HF **3 Claims**

1. In the process for the hydroformylation of olefin hydrocarbons of 2 to about 8 carbon atoms at a temperature of from about 100° to 350° C. at a pressure of from about 700 to about 1800 psig in the presence of an iron catalyst, the improvement which consists essentially of conducting said hydroformylation in contact with an active catalyst formed under hydroformylation conditions, said catalyst comprising a major amount of a solid acidic calcined support comprised of about 45 to 95 weight percent amorphous silica-alumina, said support containing a separate phase of alumina constituting about 5 to 55 weight percent of said support, the total alumina content of said support being about 20 to 70 weight percent, said separate phase alumina resulting from the calcination of a mixture of amorphous hydrous alumina and alumina monohydrate, said catalyst being initially introduced in a form consisting essentially of said major amount of support and a minor amount of iron constituting from about 0.001 to about 0.1 weight percent of the catalyst.

4,018,835

METHOD OF PRODUCING POLYHYDRIC ALCOHOLS

Frunze Bizhanovich Bizhanov, ulitsa Dzhambula, 180, kv. 1; Dmitry Vladimirovich Sokolsky, prospekt Abaya, 31, kv. 38; Ashim Kuranbaevich Omarov, ulitsa Dzhambula, 13, kv. 37, all of Alma-Ata; Akhmed Miftakhovich Khisametdinov, prospekt Kommunisticheskiy, 95, Chimkent; Sagynbek Ongarbaev, prospekt Kosmonavtov, proezd Festivalny, 7, Chimkent, and Nikolai Ivanovich Popov, prospekt Kosmonavtov, 19, kv. 3, Chimkent, all of U.S.S.R.

Continuation of Ser. No. 141,426, May 7, 1971, abandoned. This application Feb. 13, 1976, Ser. No. 658,049
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 C **11 Claims**

1. A method of producing a polyhydric alcohol comprising hydrogenating a solution of a monose in the presence of a catalyst consisting essentially of Ni and Fe in the ratio from 24:1 to 1:1 at a temperature of from 20°to 120° C. and a hydrogen pressure of 10 to 80 kg/cm², the catalyst being obtained by aqueous caustic leaching of an alloy of nickel, aluminum and iron.

4,018,836

PRODUCTION OF MONOCHLORO-SUBSTITUTED SATURATED COMPOUNDS

Herman S. Bloch, Skokie, and Louis Schmerling, Riverside, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 507,086, Sept. 18, 1974, abandoned. This application June 21, 1976, Ser. No. 698,238
Int. Cl.² C07C *17/26, 23/10, 23/24*
U.S. Cl. 260—648 R 8 Claims

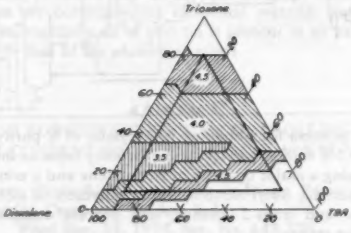
1. In a process for the production of a monochloro-substituted saturated compound which is effected by condensing a saturated cycloalkyl hydrocarbon selected from the group consisting of a cycloalkane having from 5 to about 8 carbon atoms in the ring, a bicycloalkyl having from 10 to 16 carbon atoms in the rings and a polycycloalkane having from 6 to 14 carbon atoms in the rings with a chloromonoolefin possessing not more than 4 carbon atoms and having the chlorine atom attached to one of the doubly-bonded carbon atoms in the presence of a free radical-generating peroxide catalyst at a temperature at least as high as the decomposition temperature of said catalyst and a pressure of from 1 to about 100 atmospheres, and recovering the resultant monochloro-substituted saturated compound, the improvement which comprises effecting the reaction in the presence of a promoter comprising hydrogen chloride.

4,018,837

STABILIZED METHYLCHLOROFORM

Wesley L. Archer, Midland; Elbert L. Simpson, Auburn, and Raymond R. Gerard, Bay City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 281,242, Aug. 16, 1972, abandoned, and a continuation-in-part of Ser. No. 281,243, Aug. 16, 1972, abandoned, and a continuation-in-part of Ser. No. 281,244, Aug. 16, 1972, abandoned, and a continuation-in-part of Ser. No. 281,245, Aug. 16, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 527,003
Int. Cl.³ C07C *17/42*
U.S. Cl. 260—652.5 R 11 Claims



1. A 1,1,1-trichloroethane composition stable in the liquid and vapor phases in the presence of aluminum, zinc, copper, iron and their alloys which consists of 1,1,1-trichloroethane and based on the total weight of the composition (A) 3.5 to 4.5 weight percent of a mixture selected from the following:

a. dioxane, dioxolane and trioxane;
b. dioxane, dioxolane and nitromethane;
c. dioxane, trioxane and nitromethane;
d. dioxane, dioxolane and tert. butyl alcohol;
e. dioxane, trioxane and tert. butyl alcohol;
f. dioxolane, trioxane and nitromethane;
g. dioxolane, trioxane and tert. butyl alcohol;
h. dioxane, tert. butyl alcohol and nitromethane; and
i. trioxane, tert. butyl alcohol and nitromethane,

and (b) as the essential acid acceptor from about 0.25 to about 1 percent by weight of a C_{3-8} monoalkylene epoxide, epichlorohydrin or cyclohexene epoxide, provided that when nitromethane is not a compound selected from the list above at least 0.25 to about 0.8 weight percent nitromethane is present, said compositions (a) through (i) being within the parameters of the inner triangle of the appropriate FIGS. 1–9.

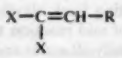
4,018,838

PROCESS OF PREPARING ALKENES

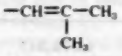
Peter John Vernon Cleare, Ascot, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 9, 1976, Ser. No. 675,267
Claims priority, application United Kingdom, Apr. 17, 1975, 15862/75
Int. Cl.³ C07C *21/00*
U.S. Cl. 260—654 R 7 Claims

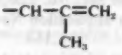
1. A process for the preparation of a compound of formula:



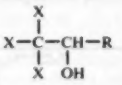
wherein X is halogeno and R is either a group of formula:



or a group of formula:



which comprises treating a haloalcohol of formula:



with powdered zinc in glacial acetic acid at a temperature within the range 25° to 110° C, wherein the zinc is used in an amount of from one to two moles per mole of haloalcohol.

4,018,839

HYDROCARBON ISOMERIZATION PROCESS

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 584,438, June 6, 1975, which is a continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 7, 1976, Ser. No. 693,662
Int. Cl.² C07C *5/22, 5/28, 13/00*
U.S. Cl. 260—666 R 10 Claims

1. A process for isomerizing a naphthenic hydrocarbon containing from 5 to about 20 carbon atoms which comprises contacting said hydrocarbon at isomerization conditions with a catalytic composite comprising a porous alumina carrier containing, on an elemental basis, about 0.01 to about 2 weight percent platinum or palladium, about 0.01 to about 2 weight percent rhodium, about 0.01 to about 5 percent tin and about 0.1 to about 10 weight percent halogen, wherein said platinum or palladium, rhodium and tin are uniformly dispersed throughout said alumina carrier, wherein substantially all of said platinum or palladium and rhodium are present in the corresponding elemental metallic states and wherein substantially all of said tin is present in an oxidation state above that of the elemental metal.

4,018,840
PROCESS FOR PREPARING ALKENYLBENZENES

Kazumi Iwata; Michiyuki Tokashiki, and Takeo Shima, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

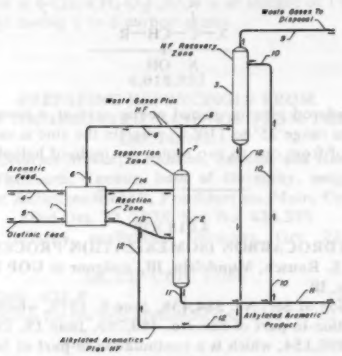
Filed Dec. 24, 1974, Ser. No. 536,128
Int. Cl.² C07C *15/09*
U.S. Cl. 260—668 B 4 Claims

1. In a process for the production of alkenylbenzene by the reaction of alkylbenzene with 1,3-butadiene in the presence of an alkali-metal catalyst in a reaction zone to form a reaction product containing alkenylbenzene, butadiene dimer, and alkali-metal catalyst, and separating this mixture in additional zones to provide said alkenylbenzene, the improvement which comprises first contacting fresh alkylbenzene feed stock with said reaction product of said reaction zone after it has left said zone to remove essentially all water and oxygen present in said alkylbenzene, separating said water-free and oxygen-free alkylbenzene from said reaction product, butadiene dimers, and said alkali-metal catalyst, and passing said water-free, dimer-free, and catalyst-free alkylbenzene to said reaction zone.

4,018,841
PROCESS FOR ALKYLATION OF AROMATICS

Michael Z. Mikulicz, Palatine; William G. Boney, Rolling Meadows, and Bipin V. Vora, Wheeling, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 520,811, Nov. 4, 1974, Pat. No. 3,957,902. This application Nov. 13, 1975, Ser. No. 631,564
The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.
Int. Cl.² C07C *15/00*
U.S. Cl. 260—671 R 1 Claim



1. An alkylation process which comprises the steps of:
a. reacting olefins with aromatic compounds in contact with hydrogen fluoride catalyst in a reaction zone;
b. separating from the resultant reaction mixture, in a separation zone, an alkylated aromatic product and a stream of unreacted aromatic compounds and hydrogen fluoride;
c. removing from the reaction zone a gaseous stream containing hydrogen fluoride;
d. removing from the separation zone a gaseous stream containing hydrogen fluoride;
e. returning said stream of unreacted aromatic compounds and hydrogen fluoride to said reaction zone;
f. combining said gaseous streams from step (c) and step (d) and contacting said combined gaseous streams with a portion of said alklated aromatic product to absorb hydrogen fluoride from said combined gaseous streams into said portion of the alkylated aromatic product; and
g. passing said portion of the alkylated aromatic product, containing absorbed hydrogen fluoride from contacting step (f) to the separation zone of step (b).

4,018,842
SELECTIVE HYDROGENATION OF α-PINENE TO cis-PINANE

Levy A. Canova, Orange Park, Fla., assignor to SCM Corporation, New York, N.Y.

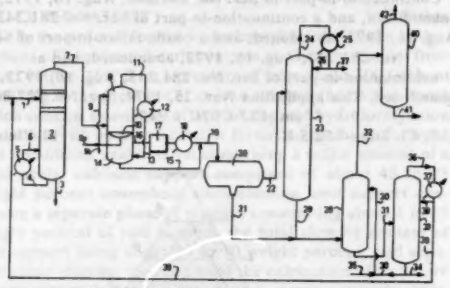
Filed May 27, 1976, Ser. No. 690,558
Int. Cl.² C07C *5/14, 13/32*
U.S. Cl. 260—675.5 5 Claims

1. In the stereoselective hydrogenation of α-pinene to cis-pinane which comprises hydrogenating α-pinene under hydrogenation conditions at hydrogenation pressures and temperatures with a nickel hydrogenation catalyst, the improvement to achieve increased stereoselectivity which comprises carrying out said hydrogenation in the presence of a nickel catalyst which has an effective fraction of its reactive surfaces inactivated.

4,018,843
PROCESS FOR THE OBTAINING OF ISOBUTYLENE OF HIGH PURITY

Jean-Pierre Michaux, Chatou, and Guy Arnaud, Le Havre, both of France, assignors to Compagnie Francaise de Raffinage, Paris, France

Filed May 4, 1976, Ser. No. 683,178
Claims priority, application France, May 9, 1975, 75.14589
Int. Cl.² C07C *7/04, 11/08*
U.S. Cl. 260—677 A 8 Claims



1. A process for obtaining isobutylene of a purity greater than 99.5% with good yield and efficiency from an initial feed comprising a major quantity of isobutylene and a minor quantity of tertiary butyl alcohol, water, polymers of isobutylene, and cis- and trans-2-butenes, said process comprising the following stages:
A. separating by distillation, on the one hand, isobutylene of a purity equal to or greater than 99.5%, and on the other hand, a mixture containing tertiary butyl alcohol, water, polymers of isobtylene, cis- and trans-2-butenes and isobutylene in such amount that it represents from 0 to 15% by weight of the isobutylene contained in the initial feed;
B. washing the mixture obtained in the stage (A) with water to obtain, on the one hand, an aqueous phase containing tertiary butyl alcohol and, on the other hand, an organic phase containing the isobutylene polymers, the cis- and trans-2-butenes, the isobutylene not separated in stage (A), and the tertiary butyl alcohol not dissolved in the wash water;
C. distilling the organic phase from stage (B), to separate the polymers of isobutylene from a mixture containing isobutylene and the cis- and trans-2-butenes, whereby the isobutylene contained in said resulting mixture is capable of recovery by extraction;
D. distilling the aqueous phase from stage (B), to separate water from an azeotrope of tertiary butyl alcohol and water, whereby the tertiary butyl alcohol in the azeptrope is capable of being dehydrated to isobutylene.

4,018,844

LONG CHAIN INTERNALLY UNSATURATED ALKENES

Otto Meresz, 8 Wallingford Road, and Cecilia Mozsgai, 10 Sunny Glenway No. 103, both of Don Mills, Ontario, Canada

Division of Ser. No. 368,960, June 11, 1973, Pat. No. 3,932,616. This application Sept. 22, 1975, Ser. No. 615,739
Claims priority, application United Kingdom, June 26, 1972, 29835/72
Int. Cl.² C07C *11/02, 11/12*
U.S. Cl. 260—677 R 2 Claims

1. A long chain internal alkene selected from the group consisting of cis-9-docosene, cis-9-tetracosene, 2-methyl-cis-14-tricosene, 2-methyl-cis-15-tetracosene, cis-9-heneicosene, 2-methyl-cis-11-eicosene.

4,018,845

HYDROCARBON ISOMERIZATION PROCESS

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 584,438, June 6, 1975, which is a continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 7, 1976, Ser. No. 693,661
Int. Cl.² C07C *5/22, 5/28*
U.S. Cl. 260—683.2 10 Claims

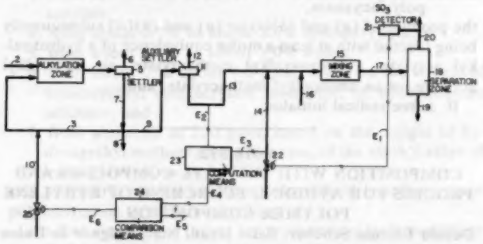
1. A process for isomerizing an olefinic hydrocarbon which comprises contacting said hydrocarbon at isomerization conditions with a catalytic composite comprising a porous alumina carrier containing, on an elemental basis, about 0.01 to about 2 weight percent platinum or palladium, about 0.01 to about 2 weight percent rhodium, about 0.01 to about 5 weight percent tin and about 0.1 to about 10 weight percent halogen, wherein said platinum or palladium, rhodium and tin are uniformly dispersed throughout said alumina carrier, wherein substantially all of said platinum or palladium and rhodium are present in the corresponding elemental metallic states and wherein substantially all of said tin is present in an oxidation state above that of the elemental metal.

4,018,846

METHOD FOR CONTINUOUSLY CONTROLLING THE WATER CONTENT OF SULFURIC ACID ALKYLATION CATALYST

Ivan Mayer, Summit, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 29, 1975, Ser. No. 645,270
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.59 7 Claims



1. In an alkylation process wherein an isoparaffin is reacted with olefins in the presence of an acid catalyst to provide an acid catalyst-hydrocarbon mixture to a settling zone wherein a hydrocarbon product is separated from the acid catalyst, a major portion of the acid catalyst from said settling zone is being recycled to the alkylation zone, and wherein fresh acid is being added to said alkylation process, the improvement which comprises continuously controlling the water content of the acid catalyst by continuously controlling the addition rate of fresh acid to said alkylation process, said catalyst comprising sulfuric acid including water according to the steps of:

1. withdrawing a sample of the acid catalyst from said settling zone,
2. intimately contacting said sample with a stream of fuming sulfuric acid in an amount sufficient to ensure substantially complete reaction of the water present in said sample with the SO_3 present in said fuming sulfuric acid and thereby forming concentrated acid having substantially no free water present therein;
3. sensing the presence of SO_3 evolved in step (2) after said complete reaction of the water present in said sample said sensed presence of SO_3;
4. controlling the rate of fuming sulfuric acid addition in step (2) in response to the control signal of step (3) such that said concentrated acid in step (2) is at the point of incipient fuming;
5. sensing the flow rate of the sample being withdrawn in step (1) and the flow rate of said fuming sulfuric acid stream being added in step (2);
6. providing a signal corresponding to the water content of the sample of step (1) in accordance with the sensed flow rate of said sample and the flow rate of said fuming sulfuric acid of step (5);
7. providing a reference signal in a computation means corresponding to a desired water content in said acid catalyst;
8. comparing the signals from steps (6) and (7) to provide a control signal;
9. controlling the addition rate of fresh acid catalyst to said process in accordance with the control signal from step (8) and thereby controlling the water content of the acid catalyst during the alkylation process.

4,018,847

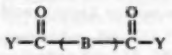
FLEXIBLE COATING COMPOSITIONS

James William Messerly, Stow, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

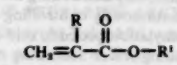
Filed Oct. 1, 1975, Ser. No. 618,631
Int. Cl.² C08L *63/00*
U.S. Cl. 260—831 12 Claims

1. A composition comprising

A. 100 parts by weight of at least one amine-terminated liquid polymer containing an average from about 1.7 to about 3 amine groups per molecule, said groups being primary, secondary or a mixture thereof, and said polymer having the formula



wherein Y is a univalent radical obtained by removing hydrogen from an amine group of an aliphatic, alicyclic, heterocyclic or aromatic amine containing from 2 to 20 carbon atoms and at least two amine groups, at least two of said amine groups being primary, secondary or a mixture thereof, and B is a polymeric backbone comprising carbon-carbon linkages and containing polymerized units of at least one vinylidene monomer having at least one terminal $CH_2{=}C<$ group, said monomer being selected from the group consisting of (a) monoolefins containing 2 to 14 carbon atoms, (b) dienes containing 4 to 10 carbon atoms, (c) vinyl and allyl esters of carboxylic acids containing 2 to 8 carbon atoms, (d) vinyl and allyl ethers of alkyl radicals containing 1 to 8 carbon atoms, and (e) acrylic acids and acrylates having the formula



said R being hydrogen or an alkyl radical containing 1 to 3 carbon atoms and said R^1 being hydrogen, an alkyl radical containing 1 to 18 carbon atoms, or an alkoxyalkyl, alkythioalkyl or cyanoalkyl radical containing 2 to 12 carbon atoms,

B. from about 10 to about 50 parts by weight of at least one non-cycloaliphatic epoxy resin containing at least an average of about 1.7 epoxy groups per molecule, said resin having an epoxy equivalent weight from about 70 to about 6,000, and

C. from about 20 to about 100 parts by weight of at least one phenol-aldehyde resin, said phenolaldehyde resin being a resole or novolac, and said novolac being cured with hexamethylentetramine.

4,018,848

HIGH SOLIDS CAN COATING COMPOSITIONS BASED ON EPOXY RESIN, CROSSLINKING AGENT, FLEXIBILIZING POLYOL, CO-REACTIVE ACID CATALYST, AND SURFACE MODIFIER

Ram Tirth Khanna, Linden Heath, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 536,323, Dec. 24, 1974, Pat. No. 3,960,979. This application Mar. 12, 1976, Ser. No. 666,497

Int. Cl.² C08L *63/00*

U.S. Cl. 260—834 **14 Claims**

1. A high solids coating composition consisting essentially of

A. 30–65 parts by weight, based on the components (A), (B), (C),(D), and (E), of an epoxy resin containing at least two epoxy groups per molecule and having a molecular weight not exceeding 2,500;

B. 10–35 parts by weight, based on components (A), (B), (C), (D), and (E), of a nitrogen resin crosslinking agent;

C. 20–40 parts by weight, based on the components (A), (B), (C), (D), and (E), of a polyol, selected from the group consisting of: polyester polyol and polyether polyol, having a minimun of two hydroxyl groups per molecule, a molecular weight range of 100 to 4000, and a hydroxyl number range of 15 to 560;

D. 0.5–10 parts by weight, based on the components (A), (B), (C), (D), and (E), of at least one acid catalyst capable of co-reacting with and becoming permanently bound to components (A) and/or (C) of said coating composition selection from the group consisting of

E. 0-2 parts by weight, based on the components (A), (B), (C), (D), and (E), of a surface modifier wherein said surace modified is an acrylic polymer containing 0.5–10% by weight, based on the weight of the polymer, of acrylic acid, metacrylic acid or itaconic acid,

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4,018,849

POLYURETHANE POLYOL COMPOSITIONS MODIFIED WITH AN ALKYLENIMINE

Wen-Hsuan Chang, Gibsonia; Roger L. Scriven, Penn Hills, and Paul J. Prucnal, Monroeville, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 361,015, May 16, 1973, Pat. No. 3,917,570. This application Aug. 7, 1975, Ser. No. 602,856

Int. Cl.² C08L *61/24, 61/28*

U.S. Cl. 260—849 **11 Claims**

1. A coating composition comprising:

A. the reaction product of:

1. an ungelled, carboxyl-hydroxyl-containing urethane reaction product having an acid value of at least 1, and having an intrinsic viscosity of 1.0 deciliter per gram or less; and

2. an alkylenimine, wherein said alkylenimine was 2 or 3 carbon atoms per alkylenimine ring;

whereby at least about 0.03 percent by weight of acidic groups based on total weight of the urethane reaction product are reacted with the alkylenimine; and

B. an aminoplast resin.

4,018,850

BLOCK POLYMER, SYNTHETIC LEATHER PREPARED THEREFROM AND A METHOD FOR PREPARING THE SAME

Shoji Yoshida, Kobe, Japan, assignor to Honny Chemicals Company, Ltd., Kobe, Japan

Continuation-in-part of Ser. No. 507,796, Sept. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 286,908, Sept. 7, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,397

Int. Cl.² C08L *75/06, 75/08*

U.S. Cl. 428—425 **16 Claims**

1. A method for making a block copolymer which comprises mixing together in an organic solvent therefor, a polyglutamic ester having terminal carboxyl and amino groups and a molecular weight of at least about 1550, a reactive hydrogen containing polyether or polyester having a molecular weight of at least about 500, and an organic diisocyanate in proportions which provide from 0.88 to 10 NCO groups per reactive hydrogen atom in the resulting mixture and provide from 10% to 50% by weight based on the weight of block copolymer of polyester or polyether units in the block copolymer and in such a manner that prereaction of the organic diisocyanate with one of the polyglutamic ester and the polyether or polyester to the exclusion of the other is avoided, and heating the solution so formed to achieve reaction between the polyglutamic ester, polyether or polyester and organic diisocyanate.

4,018,851

CURABLE POLY(ALKYLENE) ETHER POLYOL-BASED GRAFTED RESINS HAVING IMPROVED PROPERTIES

Louis J. Baccei, Newington, Conn., assignor to Loctite Corporation, Newington, Conn.

Filed Mar. 12, 1975, Ser. No. 557,564

Int. Cl.² C08L *75/08*

U.S. Cl. 260—859 R **56 Claims**

1. A curable adhesive and sealant composition comprising:

I. a polymerizable product corresponding in structure to a reaction product of:

a. a poly(alkylene)ether polyol to which a vinyl radical has been grafted, with either of:

b. (*i*) a molar excess of a reaction product of: a molar excess of an aromatic or cycloaliphatic polyisocyanate with a compound selected from the group consisting of an aromatic or cycloaliphatic polyol or polyamine, or (*ii*) a molar excess of an aromatic or cycloaliphatic polyisocyanate,

the product of (*a*) and (*b*)(*i*) or (*a*) and (*b*)(*ii*) subsequently being reacted with at least a molar equivalence of a hydroxyalkyl acrylate, a hydroxyalkyl methacrylate, an aminoalkyl acrylate, or an aminoalkyl methacrylate; and

II. a free radical initiator.

4,018,852

COMPOSITION WITH TRIALLYL COMPOUNDS AND PROCESS FOR AVOIDING SCORCHING OF ETHYLENE POLYMER COMPOSITION

Donald Lincoln Schober, Belle Mead, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 527,854, Nov. 27, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,378

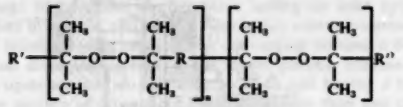
Int. Cl.² C08F *8/06;* **C08J** *3/24*

U.S. Cl. 260—878 R **65 Claims**

1. A scorch resistant vulcanizable composition comprising, in weight ratio,

100 parts by weight of ethylene polymer,

about 0.1 to 5.0 parts by weight of at least one first peroxide compound which has a decomposition half-life of about 0.5 to 4.5 minutes at 160° to 200° C. and has the structure



wherein

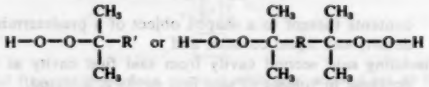
R is a C_2 to C_{12} divalent hydrocarbon radical,

R′ and R″ are the same or different C_1 to C_{12} monovalent hydrocarbon radicals, and

n is a whole number of 0 or 1,

about 0.1 to 2.0 parts by weight of at least one second peroxide which has a decomposition rate which is at least about 20 to 100 times slower than that of said first peroxide compound,

said second peroxide having the structure



and about 0.1 to 5.0 parts by weight of at least one organic compound containing at least three allyl groups.

4,018,853

CROSSLINKED, HYDROPHILIC RODS OF PYRROLIDONE-METHACRYLATE GRAFT COPOLYMERS

Albert R. Le Boeuf, Sturbridge, and William R. Grovesteen, West Dudley, both of Mass., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 526,022, Nov. 21, 1974, Pat. No. 3,978,164. This application Mar. 8, 1976, Ser. No. 664,442

Int. Cl.² C08L *31/02*; G02B *5/14*

U.S. Cl. 260—885 **4 Claims**

1. A cast, substantially strain-free, dimensionally stable, sparingly crosslinked, hydrophilic, substantially cylindrical polymeric rod consisting essentially of polymerized random graft copolymers containing:

1. from about 67.2% to about 79.3% hydroxyethyl methacrylate;
2. from about 14.25% to about 35% poly-N-vinyl pyrrolidone.
3. from about 0.1% to about 4.04% ethylene glycol dimethacrylate;
4. from about 0.1% to about 2.5% methacrylic acid;
5. from about 0.1% to about 5.0% water;
6. from about 0 to about 4.0 ppm, based on the weight of hydroxyethyl methacrylate monomer, of hydroquinone inhibitor; and
7. from about 50 to 250 ppm, based on the weight of hydroxyethyl methacrylate monomer, of the methyl ether of hydroquinone, as an inhibitor;

said polymeric rod having been polymerized in a three stage polymerization process comprising:

a. a first stage, using only a low temperature polymerization inhibitor, with substantially all the oxygen having been removed from the polymerization mix prior to and during the polymerization reaction; the initial polymerization reaction being conducted at from about 23° to about 30° C for from about 16 to about 36 hours, with the heat of the reaction continuously absorbed to control the reaction exotherm; followed by

b. a second stage wherein the product of (a) is heated to a temperature of from about 40° to about 80° C in the absence of any additional polymerization initiator, without control of the reaction exotherm, for from two to six hours; followed by

c. a third stage polymerization, wherein the product of (b) is heated to a temperature of from about 105° to about 125° C, in the absence of any additional polymerization initiator, for from 24 to 36 hours.

4,018,854

CARBOXYPHOSPHONATES

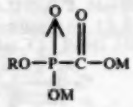
Colin Leslie McIntosh, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 474,537, May 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 381,619, July 23, 1973, abandoned. This application June 25, 1975, Ser. No. 590,374

Int. Cl.² C07C *9/32*; A01N *9/36*

U.S. Cl. 260—941 **2 Claims**

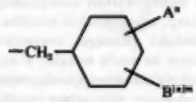
1. A compound of the formula:



wherein

M is sodium, lithium, potassium, calcium, magnesium, or barium

R is alkyl of 1 to 8 carbons, optionally substituted with a chlorine, a bromine, a fluorine, or an iodine atom; alkenyl of 3 to 8 carbon atoms, or



where

A is chlorine or methyl,

B is chlorine or methyl,

n is 0 or 1,

m is 0 or 1.

4,018,855

VULCANIZATION INHIBITING COMPOUNDS

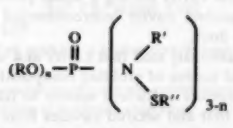
Robert J. Arnold, Evanston, and Marion J. Gattuso, Hoffman Estates, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 533,573, Dec. 17, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,121

Int. Cl.² C07F *9/24*

U.S. Cl. 260—947 **6 Claims**

1. A compound having the generic formula:



in which R is an alkyl radical of from 1 to 6 carbon atoms, R′ and R″ are phenyl or cycloalkyl radicals containing from 4 to about 8 carbon atoms and *n* is an integer of from 1 to 2.

4,018,856

FUEL INCREASE SYSTEM FOR ENGINE

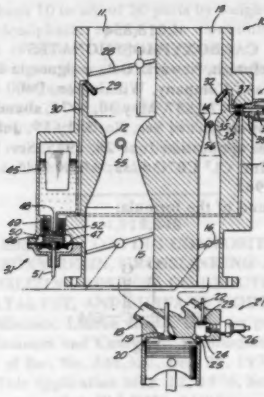
Genjiro Hamakawa, Tokorozawa, and Kenji Naito, Kawasaki, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 10, 1975, Ser. No. 612,228

Claims priority, application Japan, Sept. 13, 1974, 49-105828

Int. Cl.² F02M 7/08

U.S. Cl. 261—23 A 6 Claims



1. For use with an internal combustion engine having an auxiliary combustion chamber in communication with each main combustion chamber, respectively, and having a main carburetor intake passage for supplying a lean mixture to each main combustion chamber and an auxiliary carburetor intake passage for supplying a rich mixture to each auxiliary combustion chamber, the improvement comprising, in combination: an acceleration pump, acceleration nozzles, one opening into each carburetor intake passage, respectively, passageways connecting the pump to each nozzle, a control valve in the passageway connecting the pump to the nozzle in the auxiliary carburetor intake passage, the other passageway being open and unrestricted, and means for opening said control valve when the ambient temperature is low and for closing said control valve when the ambient temperature is high.

4,018,857

METHOD AND A DEVICE FOR THE PRODUCTION OF CERAMIC MOULDINGS, AND MORE ESPECIALLY OF MAGNETIZED FERRITE MOULDINGS

Rolf Schubart, Kochel am See, Germany, assignor to Dorst-Keramikmaschinen-Bau Inh. Otto Dorst u. Dipl.-Ing. Walter Schlegel, Kochel am See, Germany

Division of Ser. No. 472,680, May 23, 1974, Pat. No. 3,958,908. This application Sept. 24, 1975, Ser. No. 616,325

Int. Cl.² B28B 1/26

U.S. Cl. 264—24 4 Claims

1. A method for producing ceramic mouldings from a source of mouldable composition suspended in a liquid, comprising the steps of:

providing a first cavity having a liquid permeable wall;

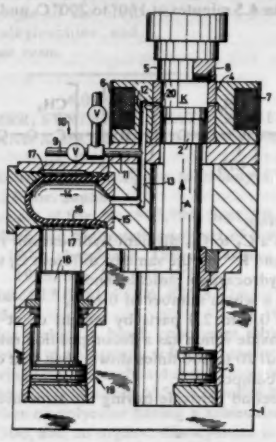
providing a second cavity interconnected with said first cavity by a duct;

filling, simultaneously said first cavity and said second cavity from said source of molding composition through said duct at a pressure sufficient merely to fill said cavities;

isolating said first and second cavities from said source;

decreasing the volume of said second cavity to force said molding composition in said second cavity through said duct to thereby increase the pressure of said molding composition in said first cavity such that a portion of the liquid of said composition is discharged through said permeable wall;

decreasing the volume of said first cavity to reduce the



contents thereof to a shaped object of a predetermined density and liquid content; and

isolating said second cavity from said first cavity as the decrease in volume of said first cavity is initiated.

4,018,858

METHOD OF MANUFACTURING REFRACTORY ARTICLES

Ian Richard Walters, Huddersfield, and Harold Garton Emblem, Mirfield, both of England, assignors to Zirconal Processes Limited, Bromley, England

Filed Mar. 24, 1975, Ser. No. 561,245

Claims priority, application United Kingdom, Mar. 28, 1974, 13834/74; Aug. 13, 1974, 35610/74

Int. Cl.² C04B 35/04, 35/48

U.S. Cl. 106—57 7 Claims

1. A method of manufacturing refractory articles comprising the steps of:

a. preparing a gellable, liquid binder for a refractory powder by mixing an aqueous solution of a zirconium salt and a dispersion of calcined magnesia powder in a mixture of from 20 to 90% water and from 80 to 10% of a polyhydric alcohol;

b. mixing a refractory powder with the liquid binder to form a liquid, flowable slurry thereof, the amounts of zirconium salt, magnesium powder and refractory powder being such that the slurry will set to a coherent state upon standing;

c. pouring the slurry while liquid and flowable into a mold;

d. allowing the slurry in the mold to set to form a coherent green shape; and

e. removing the green shape from the mold, drying the green shape, and firing the dried green shape to form a sintered refractory mass.

4,018,859

ARRANGEMENT FOR AERATING OF LIQUIDS

Hans Müller, Alte Landstr. 415, 8707 Mannendorf, Switzerland

Continuation of Ser. No. 419,726, Nov. 28, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,305

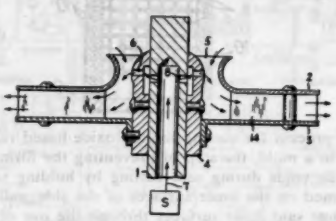
Claims priority, application Germany, Dec. 1, 1972, 017630; Switzerland, June 8, 1973, 008428/73

Int. Cl.² B01F 3/04

U.S. Cl. 261—87 13 Claims

1. In an arrangement for aerating fluids, a combination

comprising a vessel for a fluid; centrifugal aerating means, including a hollow substantially disc-shaped rotor having two axially-spaced end walls mounted for rotation in said vessel and having a hub, a periphery of said rotor being formed with a plurality of outlet openings communicating with the interior of said rotor, said rotor and hub bounding a Venturi-shaped passage of hourglass configuration having an inlet opening formed in an axial end of said rotor which communicates with said interior having an upstream converging portion, a downstream diverging portion, and a throat portion intermediate said upstream and downstream portions and having a transverse section of cross-sectional area smaller than any cross-sectional area of said upstream and downstream portions; a first and a second set of elongated blades, each set being mounted on a respective end wall and extending generally in direction radially outwardly of said rotor; means for mounting



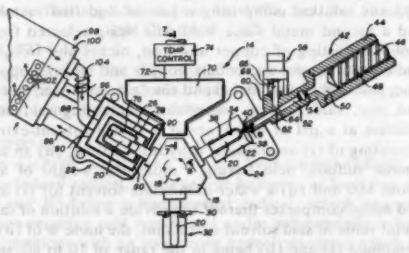
said first set in surface contact with said second set so that respective ones of said blades of said first set are in sliding abutting engagement with and at least partially overlap respective ones of said blades of said second set in axial direction of said rotor; passage means extending in part through said hub and communicating said interior with a source of gas; said passage means having one open end in communication with a source of gas, and another open end at said transverse section of said throat portion for admitting the gas directly into the fluid flowing through said passage so as to obtain a thorough intermixing of the fluid and the gas; and means for generating a suction Venturi-type effect by rotating said rotor in said vessel so that centrifugally created suction will aspirate fluid through said inlet opening and gas through said passage means into said interior, wherein the gas and fluid become mixed prior to centrifugal ejection of the thus-aerated fluid through said outlet openings.

4,018,860

INJECTION BLOW MOLDING WITH IMPROVED COOLING

John J. Farrell, Greenbrook, N.J., assignor to Farrell Patent Company, Greenbrook, N.J.

Division of Ser. No. 433,578, Jan. 15, 1974, Pat. No. 3,930,779. This application July 7, 1975, Ser. No. 593,207
Int. Cl.² B29C *17/07*
U.S. Cl. 264—39 **19 Claims**



1. A method of blow molding a plastic parison comprising blowing the parison to form a blown article, cooling a blow mold to cool the article blown in the blow mold, opening the blow mold to remove the article therefrom, and preventing sweating of the confronting cooled surfaces of the blow mold sections that move toward and away from one another by circulating dry air around the space between the open sections of the mold, said air having a dew point lower than the temperature of the confronting surfaces of the blow mold sections including the surface of the wall forming the blow mold cavity, characterized by projecting the dried air as a curtain surrounding the periphery of the mold sections to prevent any air, except air from the curtain, from entering the space between the mold sections during opening of the mold and while the mold is open, wherein said curtain is formed as a continuous curtain around the entire periphery of the space between the blow mold sections and is transversely disposed to the blow mold sections.

4,018,861

METHOD FOR PREPARING CONSUMABLE ELECTROSLAG GUIDE NOZZLE

Stanton F. Bierwith, San Leandro, Calif., assignor to Great Canadian Oil Sands Limited, Toronto, Canada

Division of Ser. No. 239,072, March 29, 1972, Pat. No. 3,761,674. This application Apr. 13, 1973, Ser. No. 350,864
Int. Cl.² B29G *1/00*
U.S. Cl. 264—61 **4 Claims**

1. A method for preparing consumable guide nozzles for use in electroslag welding comprising:

a. blending together fine metal particles and a liquid heat hardening adhesive;

b. coating the outer surface of a hollow metal guide tube open at both ends with a quantity of said blend at least equal in weight to the weight of the guide tube;

c. compressing said coated guide tube;

d. heating said compressed coated guide tube until said adhesive hardens, and

e. recovering a consumable guide nozzle suitable for use in electroslag welding comprising a hollow metal guide tube having a coating of fine metal particles adhered to the outer surface thereof.

4,018,862

METHOD FOR PRODUCING NON-WOVEN FABRIC

Satoru Saito, Nagaokakyo, Japan, assignor to Dynic Corporation, Kyoto, Japan

Filed Oct. 4, 1974, Ser. No. 512,293
Claims priority, application Japan, Oct. 6, 1973, 48-111949
Int. Cl.² B29G *5/00*
U.S. Cl. 264—137 **5 Claims**

1. A method of making a bulky non-woven fabric, comprising:

a. Prewetting with water a web comprising:

i. a hydrophilic non-shrinkable fiber, 100 parts by weight, and

ii. a fiber which is heat shrinkable when wet, 10 to 50 parts by weight;

b. applying to portions of said wet web or in a pattern thereon, a curable binder in a liquid or pasty condition;

c. heating and shrinking said wet web while maintaining said binder in an uncured state to give a bulky non-woven fabric; and

d. drying said wet web to cure said binder, resulting in a finished bulky non-woven fabric.

4,018,863

PROCESS FOR FLANGING POLYTETRAFLUOROETHYLENE PIPES

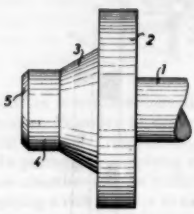
Ernst Schneiders, Erftstadt Kierdorf, and Wilhelm Klocker, Bruhl, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sept. 30, 1974, Ser. No. 510,465

Claims priority, application Germany, Oct. 4, 1973, 2349818

Int. Cl.² B29C *27/16*; B29D *3/00*

U.S. Cl. 264—249 **7 Claims**



1. In a process for flanging a pipe consisting of a thermoformable plastic material, wherein said pipe is placed in a metal conduit having a diameter slightly larger than the diameter of said pipe and terminating at one end thereof in a solid flange which is rigidly secured thereto, and wherein said pipe is so placed in said conduit that one end extends outwardly from the solid flange, and wherein an expandable supporting mandrel is positioned within said pipe which is expandable from the outside so as to bring said pipe into close contact with said conduit around it, and wherein the one end of said pipe extending outwardly from the solid flange of said conduit is at first cone-shaped flared and thereafter formed to a flange and the resulting flange is chilled by spraying a coolant thereonto, the improvement according to which the thermoformable plastic material consists of polytetrafluoroethylene (PTFE); a first metal implement is heated to temperatures within the range of about 180° to 210° C prior to flaring the end of said pipe; the end of said pipe and the first implement being forced against each other for flaring the end of said pipe under an area pressure within the range 5 to 20 kg/cm²and under a uniform sliding movement of the end of said pipe and the first implement, relatively to each other, within the range 5 to 15 rpm; and the end of said pipe being flared in a first step within the range of about 0.5 to 3 minutes; a second metal implement is heated to temperatures within the range of about 180° to 210° C prior to forming of a flange on the flared end of said pipe; the flared end of said pipe and the second implement being forced against each other for forming the end of said pipe to a flange under an area pressure within the range 5 to 20 kg/cm² and under a uniform sliding movement of the end of said pipe and the second implement, relative to each other, within the range 5 to 15 rpm; and the flared end of said pipe being formed to a flange in a second step within the range of about 1 to 3 minutes whereby a PTFE pipe is flanged while maintaining the pipe below a temperature at which toxic gases are released.

4,018,864

METHOD FOR MAKING FUSED REFRACTORY PRODUCTS

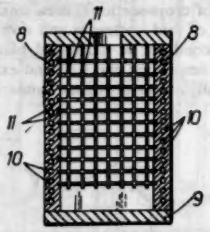
Bernard Minssen, Avignon, and Georges Parigot, Le Pontet, both of France, assignors to L'Electro-Refractaire, France

Division of Ser. No. 83,706, Oct. 26, 1970, abandoned. This application Oct. 25, 1972, Ser. No. 300,493

Claims priority, application France, Oct. 27, 1969, 69.36769

Int. Cl.² B28B *1/14*; B29C *5/00*

U.S. Cl. 264—299 **5 Claims**



1. In a process for casting molten oxide-based refractory materials in a mold, the step of preventing the formation of casting side voids during said casting by holding solidified crusts formed on the inner surfaces of the side walls of the mold against said inner surfaces through the use of a mold having a plurality of discontinuities provided on the inner surfaces of its walls, said discontinuities each having a width of about 0.5 to 1.0 millimeters and being laterally spaced about 5 to 80 millimeters from discontinuities extending in the same general direction.

4,018,865

SOLVENT-EXTRACTION PROCESS FOR RECOVERY AND SEPARATION OF METAL VALUES

Lawrence V. Gallacher, East Norwalk, Conn., assignor to King Industries, Inc., Norwalk, Conn.

Filed Mar. 29, 1976, Ser. No. 671,346

Int. Cl.² B01D *15/04*; C22B *15/00, 23/04, 19/26*

U.S. Cl. 423—24 **28 Claims**

1. A process for recovering a first metal value from an aqueous solution comprising a pair of said first metal value and a second metal value, said pair being selected from the group consisting of copper and iron, nickel and iron, nickel and cobalt, copper and cobalt, copper and nickel, copper and zinc, zinc and nickel, nickel and zinc, zinc and iron, and cobalt and zinc, said process comprising contacting said aqueous solution at a pH of below about 3 with a solvent-extractant consisting of (i) an aliphatic α-hydroxy oxime, (ii) an alkylaromatic sulfonic acid having a molecular weight of at least about 400 and (ii) a water-immiscible solvent for (i) and (ii) and metal complexes thereof to provide a solution of said first metal value in said solvent-extractant, the mole % of (ii) in the combined (i) and (ii) being in the range of 10 to 80; separating the solution thus formed from the aqueous raffinate depleted in said first metal value; and recovering said first metal value from said separated solution.

4,018,866

METAL CARBONATE RECYCLE TO REDUCTION CIRCUIT IN THE CUPRION PROCESS

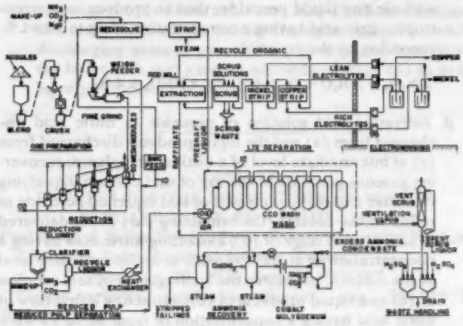
Lester J. Szabo, Prince Edward Island, Canada, assignor to Kennecott Copper Corporation, New York, N.Y.

Continuation of Ser. No. 475,991, June 3, 1974, abandoned, and a continuation-in-part of Ser. No. 311,063, Dec. 1, 1972, abandoned. This application Nov. 3, 1975, Ser. No. 628,354

The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.

Int. Cl.² C01G *3/14, 51/12, 53/12*

U.S. Cl. 423—32 **6 Claims**



2. In a process in which metal values selected from the group consisting of copper, nickel, cobalt and molybdenum are recovered from a manganese containing ore by introducing the ore into a reduction reaction vessel in which the ore is reduced, said reduction reaction vessel containing an aqueous ammoniacal ammonium carbonate leach solution of cuprous ions to allow the cuprous ions to reduce the manganese oxides in the ore to enable the metal values to be solubilized in the aqueous ammoniacal ammonium carbonate leach solution and in which cuprous ions are continuously regenerated in the leach solution by a reducing gas wherein the improvement comprises leaching metal values from said manganese containing ore with said leach solution, recovering a portion of the metal values solubilized in the leach solution, after the solubilized metal values leave the reduction reaction vessel, as a mixed metal carbonate precipitate and recycling a sufficient amount of the mixed metal carbonate back to the reduction reaction vessel so as to maintain the soluble copper content of the reduction reaction vessel at a level of at least 10 grams per liter.

4,018,867

PROCESS FOR THE DISPOSAL OF ALUMINUM CONTAINING WASTE MATERIALS

Thomas E. Lee, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 554,601, March 3, 1975, abandoned. This application June 30, 1975, Ser. No. 591,526

Int. Cl.² C01F *7/00*

U.S. Cl. 423—115 **25 Claims**

1. A process for the disposal of an aluminum containing waste material having high reactivity with water and having an aluminum compound of the formula

$R^1R^2R^3Al$

wherein each of R^1, R^2 and R^3 is a hydrocarbyl radical, a hydrocarbyloxy radical, hydrogen or halogen, at least one of R^1, R^2 and R^3 being a hydrocarbyl radical, which process comprises reacting said compound under substantially anhydrous conditions with an anhydrous hydrolysis agent which is a hydroxide or carbonate of a Group II-A element.

13. A process for the disposal of a mixed system waste material containing an aluminum compound having the formula $R^1R^2R^3Al$ and a compound R_nM, wherein each of R^1, R^2, R^3 and R_n is a hydrocarbyl radical, a hydrocarbyloxy radical, hydrogen or halogen, at least one of R^1, R^2 and R^3 being a hydrocarbyl radical, M is a Group IV-B, V-B, VI-B, VII-B or VIII element and n is an integer equal to the valence of M, which process comprises, reacting said system under substantially anhydrous conditions with an anhydrous hydrolysis agent which is a hydroxide or carbonate of a Group II-A element.

4,018,868

THERMAL CRUSHING OF ALKALI COMPOUNDS IN THE REMOVAL OF SULFUR DIOXIDES FROM A FLUE GAS

John H. Knight, Aurora, Colo., assignor to The Superior Oil Company, Houston, Tex.

Filed Mar. 19, 1975, Ser. No. 559,930

Int. Cl.² B01J *8/00;* **C01B** *17/00*

U.S. Cl. 423—244 **9 Claims**

1. A method of reducing the sulfur dioxide content of a flue gas which comprises:

a. introducing particulate nahcolite into a first zone heated to a temperature of from about 2,000° to about 4,000° F to produce thermally crushed nahcolite of a predominant particle size within the range of from about 0.1 to about 100 microns and a mean particle size of 1–20 microns;

b. transporting said thermally crushed nahcolite to a second zone containing a flue gas having sulfur dioxide impurities, said flue gas being at a temperature up to 1,500° F;

c. allowing said thermally crushed nahcolite and flue gas to remain in contact for a period of time sufficient to allow said thermally crushed nahcolite to combine with the sulfur dioxide impurities in said flue gas; and

d. removing from said flue gas said thermally crushed nahcolite containing combined sulfur dioxide.

4,018,869

PROCESS FOR THE EXTRACTIVE PURIFICATION OF PHOSPHORIC ACID CONTAINING CATIONIC IMPURITIES

Klaus Beltz, Budenheim (Rhine); Klaus Frankenfeld, Kirberg, Taunus, and Karl Gotzmann, Budenheim (Rhine), all of Germany, assignors to Chemische Fabrik Budenheim Rudolf A. Oetker, Budenheim (Rhine), Germany

Continuation of Ser. No. 367,319, June 6, 1973, abandoned. This application May 8, 1975, Ser. No. 575,639

Int. Cl.² C01B *25/16*

U.S. Cl. 423—321 S **5 Claims**

1. A process for purifying an aqueous phosphoric acid containing cationic impurities using extraction techniques which comprises:

a. adding to said aqueous phosphoric acid an organic solvent miscible in all proportions with phosphoric acid and water selected from the group consisting of an aliphatic alcohol and ketone, the weight ratio of said organic solvent to the weight ratio of P_2O_5 in said aqueous phosphoric acid being in the range of from 1:1 to 20:1

b. removing any solids residue;

c. countercurrently contacting the resulting mixture of step (a) with a concentrated solution of an inorganic multivalent cationic salt selected from the group consisting of aluminum, calcium, magnesium and zinc cationic salts, said inorganic multivalent cationic salt being soluble in water and not tending to form insoluble precipitates during such introduction, the volumetric ratio of said concentrated solution to the volume of said mixture being in the range of from 10:1 to 1:250 thereby forming a liquid aqueous inorganic salt phase including said cationic impurities and a liquid phosphoric acid-organic solvent phase;

d. separating said organic solvent phase from said inorganic salt phase;

e. repeating steps (c) and (d); and

f. recovering phosphoric acid from the organic solvent phase by distillation.

4,018,870

PREPARATION OF SYNTHETIC ZEOLITE MOLECULAR SIEVES

Thomas Vincent Whittam, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jan. 27, 1975, Ser. No. 544,671
Claims priority, application United Kingdom, Jan. 30, 1974, 4274/74
Int. Cl.² C01B *33/28*
U.S. Cl. 423—329 8 Claims

1. In a process for the manufacture of synthetic zeolites, comprising crystallizing the zeolite from a reaction mixture, the improvement comprising altering the reaction mixture by the addition thereto of an additive selected from the group consisting of crystal violet, methyl violet, nuclear fast red, methylene blue, toluidene blue, malachite green, magenta, acriflavine, and mixtures, salts and esters thereof.

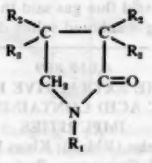
4,018,871

DISMUTATION OF TRICHLOROSILANE

Gilbert Marin, Sante-Foy-Les-Lyon, and Marcel Lefort, Caluire, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Nov. 4, 1975, Ser. No. 628,667
Claims priority, application France, Nov. 7, 1974, 74.36960
Int. Cl.² C01B *33/08*
U.S. Cl. 423—342 5 Claims

1. In a process for the preparation of dichlorosilane by treating trichlorosilane in the presence of a catalyst, the improvement wherein an α-pyrrolidone of the formula:



in which R_1 represents a straight or branched alkyl or alkenyl radical having at most 6 carbon atoms, a cyclohexyl radical or a phenyl radical and each R_2 radical, which may be identical or different, represents a hydrogen atom or a methyl radical is used as the catalyst in an amount of from 1 to 50% by weight based on the weight of the trichlorosilane and wherein the treating is carried out at a temperature of from 30° C to 120° C.

4,018,872

PROCESS FOR THE PRODUCTION OF CONCENTRATED NITRIC ACID

Diego Barba; Fabrizio Battistoni; Candido D'Agostini, and Giorgio Macchi, all of Rome, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 9, 1975, Ser. No. 639,192
Claims priority, application Italy, Dec. 20, 1974, 30824/74
Int. Cl.² C01B *21/40*
U.S. Cl. 423—394 9 Claims

1. A method for the preparation of nitric acid having a concentration of at least 98 wt.% from nitrogen peroxide obtained by catalytic oxidation of ammonia, separation of nitrogen oxide from the resulting gaseous flow and transformation of said nitrogen oxide into nitrogen peroxide, wherein said peroxide is chemically absorbed in diluted nitric acid to produce superazeotropic acid and wherein said superazeotropic acid is distilled, which comprises:

a. bringing into contact a gaseous flow containing said nitrogen peroxide, free or substantially free from water and nitrogen oxide, with nitric acid having a concentration of from 80 to 98 wt.% thus to form a solution of said peroxide in said acid;

b. bringing into contact nitric acid having a concentration of from 68 to 75 wt.% in a first stage of chemical absorption, with the gaseous products containing nitrogen peroxide and oxygen coming from a second stage of chemical absorption, thus to produce nitric acid having an increased concentration of from 70 to 80 wt.%, according to the equations

$$3\ NO_2 + H_2O \leftrightarrows 2\ HNO_3 + NO$$

$$2\ NO + O_2 \rightarrow 2\ NO_2$$

c. bringing into contact the liquid products discharged from said stage (b) in said second stage of chemical absorption with air and liquid peroxide, thus to produce superazeotropic nitric acid having a concentration of up to 90 wt.%, according to the equation:

$$2\ N_2O_4 + 2\ H_2O + O_2 + 4\ N_2 \leftrightarrows 4\ HNO_3 + 4\ N_2$$

d. delivering said solution of peroxide in nitric acid discharged from (a) and the liquid products discharged from (c) at intermediate level of a distillation column; recovering gaseous peroxide at the top of said column, liquefying the latter and recycling a part of said liquefied peroxide as reflux to the column, the remaining part being delivered to said second stage of (c); extracting nitric acid having a concentration of at least 98 wt.% at an intermediate level of the column, but above the feeding level of said solution of (a) and liquid products of (c); extracting a first flow of nitric acid having a concentration of from 80 to 98 wt.% and a second flow of nitric acid having a concentration of from 68 to 80 wt.% from the column and delivering the latter to stage (a) and to stage (b), respectively.

4,018,873

PROCESSES FOR THE PREPARATION OF CONCENTRATED NITRIC ACID

Diego Barba; Fabrizio Battistoni; Candido D'Agostini, and Giorgio Macchi, all of Rome, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 9, 1975, Ser. No. 639,194
Claims priority, application Italy, Dec. 20, 1974, 30823/74
Int. Cl.² C01B *21/40*
U.S. Cl. 423—394 7 Claims

1. A method for the preparation of nitric acid having a concentration of at least 98 wt.% from nitrogen peroxide obtained by catalytic oxidation of ammonia, separation of nitrogen oxide from the resulting gaseous flow and transformation of said nitrogen oxide into nitrogen peroxide, wherein said peroxide is chemically absorbed in nitric acid to produce superazeotropic acid and wherein said superazeotropic acid is distilled, which comprises:

a. bringing into contact a gaseous flow containing said nitrogen peroxide with nitric acid having a concentration of at least 80 wt.%, thus obtaining a solution of said peroxide in said acid; heating said solution so as to remove gaseous peroxide and liquefying said gaseous peroxide by cooling;

b. bringing into contact superazeotropic nitric acid and water or a weak aqueous solution of nitric acid in a first chemical absorption stage to provide an overall nitric acid concentration of 68 to 75%, with the gaseous products containing nitrogen peroxide and oxygen coming from a second chemical absorption stage, to produce nitric acid having an increased concentration of from 70 to 80 wt.%, according to the equations:

$$3\ NO_2 + H_2O \leftrightarrows 2\ HNO_3 + NO$$

$$2\ NO + O_2 \leftrightarrows 2\ NO_2$$

c. bringing into contact the liquid products discharged from stage (b) in said second chemical absorption stage, with

air and with a fraction of said liquefied peroxide of stage (a) to produce superazeotropic nitric acid having a concentration up to 90 wt.%, according to the equation:

$$2\,N_2O_4 + 2\,H_2) + O_2 + 4\,N_2 \leftrightarrows 4\,HNO_3 + 4\,N_2$$

d. delivering the remaining fraction of said liquefied peroxide of stage (a) to a distillation column at a point near to the top, and delivering said superazeotropic acid discharged from stage (c) to said distillation column at an intermediate point between the top and the bottom; extracting a lateral flow of nitric acid having a concentration of at least 98 wt.% at an intermediate point between said point of introduction of liquefied peroxide and said point of introduction of superazeotropic acid, extracting superazeotropic nitric acid from said distillation column and recycling the latter to said absorption stage (b), while discharging gaseous peroxide at the top and combining the latter with said gaseous peroxide of stage (a) so as to liquefy it together with the latter.

4,018,874

PROCESS FOR THE PRODUCTION OF SODIUM PERCARBONATE BY ATOMIZATION

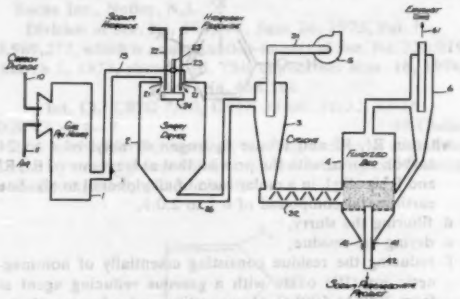
Paul Mollard, Sainte Foy Les Lyon, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Aug. 15, 1974, Ser. No. 497,537

Claims priority, application France, Aug. 28, 1973, 73.31041

Int. Cl.² C01B *15/10*

U.S. Cl. 423—415 P **10 Claims**



1. A process for the production of alkali metal percarbonates which comprises concurrently spraying separate aqueous solutions of sodium or potassium hydroxide and hydrogen peroxide into a reaction vessel and simultaneously introducing into the vessel a hot gas containing air and carbon dioxide to form particles, respectively, of sodium or potassium percarbonate, and recovering the particles.

4,018,875

AMMONIUM OXALATE PROCESS

Robert Kenneth Jordan, The Carlton House, Suite 1431, 550 Grant St., Pittsburgh, Pa. 15219

Filed Mar. 4, 1975, Ser. No. 555,151

Int. Cl.² C07C *55/06*; C01F *5/24*; C01B *31/24*

U.S. Cl. 423—419 R **5 Claims**

1. A process for the production of ammonium oxalate and metal carbonates which are stable under the conditions of the process comprising reacting a metal oxalate with an adduct of carbon dioxide with ammonia or aqueous ammonium hydroxide in a liquid media selected from water, ammonia, methanol, acetone or mixtures thereof at temperatures in the range of −50° C to 300° C under conditions sufficient to retain the liquid media in the liquid state. To form an ammonium oxalate and the corresponding metal carbonate.

4,018,876

PROCESS FOR THE PRODUCTION OF METAL OXALATES AND SODA ASH

Robert Kenneth Jordan, The Carlton House, Suite 1431, 550 Grant St., Pittsburgh, Pa. 15219

Filed Mar. 4, 1975, Ser. No. 555,189

Int. Cl.² C07C *55/06*; C01B *31/24*

U.S. Cl. 423—421 **3 Claims**

1. A process for the production of alkali metal carbonates and metal oxalates wherein the metal is other than an alkali metal, which comprises reacting an alkali metal oxalate with a metal carbonate in a liquid media selected from water, methanol, water-methanol mixtures and water acetone mixtures, at a temperature in the range of −30° C to 300° C under conditions sufficient to maintain said liquid media in the liquid state to produce alkali metal carbonate and metal oxalate.

4,018,877

PRODUCTION OF CALCIUM CARBONATE

Richard Derek Anthony Woode, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 10, 1975, Ser. No. 548,807

Claims priority, application United Kingdom, Feb. 14, 1974, 6686/74

Int. Cl.² C01F *11/18*

U.S. Cl. 423—432 **9 Claims**

1. In a process for the manufacture of calcium carbonate by carbonating an aqueous suspension of calcium hydroxide to produce calcium carbonate and separating the thus formed calcium carbonate, the improvement which comprises adding to the suspension, subsequently to a calcium carbonate primary nucleation stage of the carbonation step and before completion of the carbonation step, a complex-forming agent for calcium ions.

4,018,878

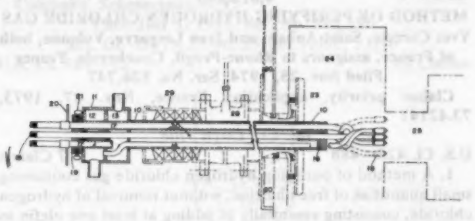
PROCESS FOR PRODUCING CARBON BLACK

Richard H. Reynolds, Westerville, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Dec. 29, 1975, Ser. No. 644,546

Int. Cl.² C09C *1/50*

U.S. Cl. 423—450 **3 Claims**

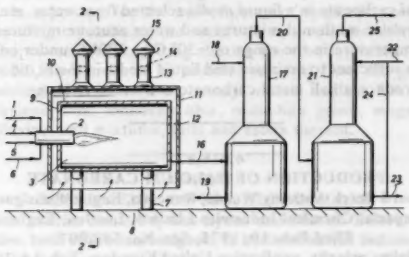


1. In the furnace process for the production of high tint, tread-grade rubber reinforcing carbon black wherein a fuel gas is essentially completely combusted in tubular chamber having a diameter substantially larger than length thereof and whereupon the resultant combustion gases enveloping a centrally confined spray of a normally liquid hydrocarbon feedstock are introduced into a tubular reaction zone to effect therein the thermal decomposition of the feedstock into carbon black under highly turbulent flow conditions, said tubular reaction zone being centrally aligned with said chamber and in open communication therewith and having a diameter substantially smaller than that of the chamber; the improvement comprising introducing a plurality of laterally disposed individual sprays of the feedstock into said reaction zone whereby the situs of injection are contiguous to said communicating opening of the reaction zone.

4,018,879
COMBUSTION OF HALOGENATED HYDROCARBON

Denis F. Winnen, Rotterdam, Netherlands, assignor to Shell Oil Company, Houstn, Tex.

Division of Ser. No. 467,532, May 6, 1974, Pat. No. 3,984,206.
This application June 21, 1976, Ser. No. 698,395
Claims priority, application United Kingdom, May 4, 1973, 21309/73
Int. Cl.² C01B 7/00
U.S. Cl. 423—481 6 Claims



1. In the process for the combustion of halogenated organic materials wherein such materials are combusted at a temperature of at least 600° C in a metal-cased refractory-lined furnace, the combustion gases formed are cooled and at least one acid constituent thereof removed by contact with an aqueous liquid, an aqueous acid solution is recovered and cooled acid-free gases are discharged to the atmosphere, the improvement which comprises flowing air through an air jacket formed by the metal casing of the furnace and a cover surrounding the furnace with the air entering the air jacket through at least one air inlet on the bottom of said cover and exiting the top of the air jacket through at least one stack on the top of said cover, the distance between the metal casing of the furnace and said cover and the number and size of the inlets and stacks being such that the temperature of the metal casing of the furnace is maintained by the flow of air between about 140° and about 375° C.

4,018,880
METHOD OF PURIFYING HYDROGEN CHLORIDE GAS

Yves Correia, Saint-Auban, and Jean Lesparre, Volonne, both of France, assignors to Rhone-Progil, Courbevoie, France

Filed Nov. 25, 1974, Ser. No. 526,747
Claims priority, application France, Nov. 27, 1973, 73.42141
Int. Cl.² C01B 7/08
U.S. Cl. 423—488 7 Claims

1. A method of purifying hydrogen chloride gas containing small quantities of free chlorine, without removal of hydrogen chloride, consisting essentially of adding at least one olefin to the impure hydrogen chloride in an amount to provide a molar ratio of olefin to free chlorine within the range of 10-1 moles of olefin to 1 mole of free chlorine, and passing the mixture in a gaseous state over activated carbon at a temperature within the range of 30° to 200° C.

4,018,881
HIGH SURFACE AREA ALUMINA AND METHOD FOR THE PREPARATION THEREOF

William J. Mattox, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 163,045, July 15, 1971, abandoned. This application Jan. 15, 1975, Ser. No. 541,278
Int. Cl.² C01F 7/02
U.S. Cl. 423—631 5 Claims

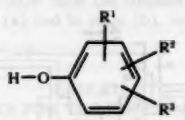
1. Process for preparing high surface area aluminas comprising reacting substantially anhydrous aluminum chloride with ammonia at temperatures ranging from about 100° to about 900° F. to form an aluminum chloride-ammonia complex comprising aluminum chloride polyammoniates having a composition corresponding to 3–6 moles NH_3/mole $AlCl_3$, and hydrolyzing said polyammoniates to obtain high surface area alumina.

4,018,882
MANUFACTURE OF GAMMA-IRON (III) OXIDE

Eberhard Koester, Frankenthal; Gerd Wunsch, Speyer; Eduard Schoenafinger, Ludwigshafen; Hans Henning Schneehage, Mutterstadt, and Helmut Jakusch, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 25, 1975, Ser. No. 616,863
Claims priority, application Germany, Oct. 4, 1974, 2447386
Int. Cl.² C01G 49/02
U.S. Cl. 423—634 5 Claims

1. A process for producing acicular magnetic gamma-iron-(III) oxide comprising the steps of:
a. suspending an acicular non-magnetic iron(III) oxide in water to form a slurry,
b. adding to said slurry a solution of a water-soluble inorganic alkaline earth metal compound, said alkaline earth metal selected from the group consisting of magnesium, calcium, barium and strontium, in an amount of from 1 to 5 percent by weight of the alkaline earth metal compound based on the iron(III) oxide,
c. adding to said slurry an alkylphenol of the formula



wherein R^1, R^2 and R^3 are hydrogen or alkyl of 4 to 24 carbon atoms, with the proviso that at least one of R^1, R^2 and R^3 is alkyl, in a molar ratio of alkylphenol to alkaline earth metal compound of 0.2 to 2.0:1,
d. filtering the slurry,
e. drying the residue,
f. reducing the residue consisting essentially of non-magnetic iron(III) oxide with a gaseous reducing agent at from 300° to 500° C, to magnetite; and subsequently
g. oxidizing the magnetite with an oxygen-containing gas, at from 200° to 400° C, to gamma-iron(III) oxide.

4,018,883
THYROXINE (T_4) RADIOIMMUNOASSAY

Margaret E. Parslow, Rancho Palos Verdes, Calif., assignor to Nichols Institute for Endocrinology, San Pedro, Calif.

Filed Mar. 10, 1975, Ser. No. 556,930
Int. Cl.² G01N 33/00; A61K 43/00
U.S. Cl. 424—1 24 Claims

1. A composite reagent for a radioimmunoassay to measure the concentration of thyroxine (T_4) in a measured quantity of human serum, the reagent comprising in the absence of non-radioactive T_4:
a blocking agent in sufficient quantity to displace essentially all of the T_4 in the measured quantity of serum bound to thyroxine-binding globulin (TBG);
an antibody in sufficient quantity to bind a significant quantity of the T_4 in the measured quantity of serum;
polyethylene glycol (PEG) in sufficient quantity to precipitate essentially all the antibody; and
a buffering agent in sufficient quantity to inhibit binding the T_4 in the measured quantity of serum to thyroxine-binding prealbumin.

14. A method of measuring the concentration of thyroxine

(T_4) in a measured quantity of human serum, the method comprising the steps of:

combining the following to form a mixture:

a blocking agent in a quantity sufficient to displace essentially all the T_4 in the measured amount of human serum from thyroxine binding globulin (TBG);

an antibody in sufficient quantity to bind a significant quantity of the T_4 in the measured quantity of serum;

polyethylene glycol (PEG) in sufficient quantity to precipitate essentially all the antibody; and

a buffering agent in sufficient quantity to inhibit binding the T_4 in the measured quantity of serum to thyroxinebinding prealbumin;

adding the mixture to the measured quantity of human serum and radioactive T_4 in sufficient quantity to give a measurable counting rate;

incubating the serum and radioactive T_4 with the mixture added to allow reaction of the T_4 in the serum and the radioactive T_4 with the antibody to proceed substantially to equilibrium, thereby producing antibody bound T_4, a percentage of which is radioactive;

removing the antibody precipitated by the PEG including the antibody bound T_4 from the supernatant; and

measuring the quantity of radioactive T_4 in the removed precipitate or the supernatant.

4,018,884

FLUOROGENIC MATERIALS AND LABELING TECHNIQUES

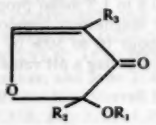
Roy Cleeland, Jr., Short Hills; Emanuel Grunberg, North Caldwell; Willy Leimgruber, Montclair, and Manfred Weigele, North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 590,655, June 26, 1975, Pat. No. 3,969,373, which is a continuation-in-part of Ser. No. 338,019, March 5, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,180

Int. Cl.² C07G *7/00;* **G01N** *31/00, 31/22, 33/16*

U.S. Cl. 424—7 **10 Claims**

1. A method for fluorescently labeling a material containing a primary amino group which comprises treating said material with a compound of the formula



wherein R_1 is lower alkyl or phenyl lower-alkyl, R_2 is phenyl, lower-alkoxyphenyl, di-lower-alkoxyphenyl, carboxyphenyl or carboxy-lower-alkyphenyl, and R_3 is phenyl or nitrophenyl;

in an aqueous medium at a pH between about 8.0 and 10.5.

4,018,885

STEROID-BINDING GLOBULIN AND PROCESS FOR PREPARING IT AND ANTIBODIES THERETO

Hans Bohn, Marbach near Marburg an der Lahn, and Wilhelm Winckler, Wenkbach, both of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed Oct. 24, 1974, Ser. No. 517,764

Claims priority, application Germany, Oct. 27, 1973, 2353973

Int. Cl.² A61K *37/04, 39/00;* **C12B** *1/00;* **G01N** *31/00*

U.S. Cl. 424—12 **5 Claims**

1. A method for making a modified steroid-binding globulin which comprises treating a steroid-binding β-globulin starting material having the following properties:

a. a specific affinity to steroid hormones,

b. a content of carbohydrates of 12.5 ± 3%, of which are 5.7 ± 1.2% hexoses, 3.9 ± 0.8% hexoseamine, calculated as N-acetyl-hexoseamine, 2.9 ± 0.9% of neuraminic acid, calculated as N-acetyl-neuraminic acid, and 0.1 ± 0.1% fucose,

c. the capacity of being precipitated by specific anti-sera,

d. an electrophoretic mobility corresponding to that of β_1-globulins,

e. a sedimentation constant of 4.1 ± 1.0 S, measured in a phosphate buffer of pH 6.8,

f. a sedimentation constant of 1.1 ± 0.3 S, measured in a 1% sodium dodecylsulfate solution, and

g. a molecular weight of 65,000 ± 5,000, with neuraminidase, at a pH within the optimum reaction range of the enzyme, until the neuraminic acid content of the steroid-binding β-globulin starting material is reduced to 0.5 ± 0.5%.

4. A modified steroid-binding globulin made by the method of claim, said modified steroid-binding globulin having the following properties:

a. a specific affinity to steroid hormones,

b. a content of carbohydrates of 10.4 ± 2.6%, of which are 5.8 ± 1.2% hexoses, 4.0 ± 0.8% hexoseamine, calculated as N-acetyl-hexoseamine, 0.5 ± 0.5% neuraminic acid, calculated as N-acetyl-neuramanic acid, and 0.1 ± 0.1% fucose,

c. the capacity of being precipitated by anti-sera which are directed against steroid-binding β-globulin,

d. an electrophoretic mobility corresponding to that of gamma-globulin,

e. a sedimentation constant of 4.1 ± 1.0 S, measured in a phosphate buffer at pH 6.8,

f. a sedimentation constant of 1.1 ± 0.3 S, measured in a 1% sodium dodecylsulfate solution, and

g. a molecular weight of 65,000 ± 5,000.

5. In the method for making an anti-serum specific to steroid-binding globulin by immunizing animals with said steroid-binding globulin, the improvement wherein the steroid-binding globulin is the modified steroid-binding globulin of claim 4.

4,018,886

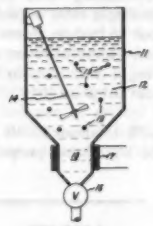
DIAGNOSTIC METHOD AND DEVICE EMPLOYING PROTEIN-COATED MAGNETIC PARTICLES

Ivar Giaever, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 1, 1975, Ser. No. 592,196

Int. Cl.² G01N *21/46, 27/00, 31/06, 33/16*

U.S. Cl. 424—12 **15 Claims**



1. A diagnostic method for determining the presence or absence of select protein in a liquid sample comprising the steps of:

dispersing a plurality of finely-divided magnetic particles each of which is coated with a layer directly bonded thereto of first protein molecules specific to said select protein in the sample liquid to facilitate contact between said coated particles and said sample liquid;

magnetically retrieving and separating said coated particles from said sample liquid;

washing said coated particles;

introducing said coated particles into a volume of cleaving agent solution in direct contact with a metallized surface to permit select protein, if present, to detach from the first protein-coated particles and

examining said metallized surface for the presence of protein adsorbed thereon.

4,018,887

AMIDE-STABILIZED DRY POWDER AEROSOL ANTIPERSPIRANT COMPOSITIONS AND METHOD OF PREPARATION

Douglas L. Danneman, Forest Park, and Jerry J. Yetter, Green Township, Hamilton County, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 888,958, Dec. 29, 1969, abandoned. This application July 27, 1971, Ser. No. 166,584

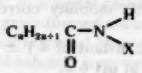
Int. Cl.² A61K *7/34, 7/36, 7/38*

U.S. Cl. 424—47 **4 Claims**

1. A powder aerosol antiperspirant composition comprising:

A. from about 2% to about 12% by weight of a finely divided dry antiperspirant powder selected from the group consisting of aluminum chlorhydroxide, and complexes of aluminum chlorhydroxide and zirconyl hydroxychloride;

B. from about 0.2% to about 1% by weight of a suspending agent for the antiperspirant comprising an amide having the formula



wherein *n* is from about 12 to about 20 and wherein X is selected from the group consisting of $-C_2H_4OH$, and $-C_3H_6OH$;

C. from about 3% to about 15% by weight of a non-toxic, non-aqueous carrier liquid of low volatility having emollient properties selected from the group consisting of lanolin, polysiloxanes of the formmula $(-R_2{}^5Si\ O-)_n$ wherein R^5 is C_1–C_4 alkyl or phenyl and wherein said polysiloxanes have a viscosity at 25° C. of from 5 to about 2,000 centistokes, polyalkylene glycols containing a fatty acid or fatty alcohol group containing from about 2 to about 20 carbon atoms, fatty alcohols containing from about 12 to about 18 carbon atoms, fatty acid esters of aliphatic alcohols wherein said esters contain from about 12 to about 26 carbon atoms, mineral oil having a specific gravity of from about 0.8 to about 0.9 at 60° F., aliphatic hydrocarbons containing from about 12 to about 26 carbon atoms, multiple ester organic compounds of from about 12 to about 16 carbon atoms having a ratio of ester groups to carbon atoms of from about 0.125 to about 0.214 and having a solubility in water of from about 0.0005% to about 0.1% at 30° C., and mixtures thereof; and

D. from about 70.7% to about 93.9% by weight of an anhydrous, non-toxic liquefiable propellant gas, under pressure.

4,018,888

AMINE-STABILIZED DRY POWDER AEROSOL ANTIPERSPIRANT COMPOSITIONS AND METHOD OF PREPARATION

Charles L. Scripps, Springfield Township, Hamilton County, and Jerry J. Yetter, Green Township, Hamilton County, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 888,959, Dec. 29, 1969, abandoned. This application Aug. 11, 1971, Ser. No. 170,970

Int. Cl.² A61K *7/34, 7/38*

U.S. Cl. 424—47 **4 Claims**

1. A powder aerosol antiperspirant composition comprising:

A. from about 2% to about 12% by weight of a finely divided dry antiperspirant powder selected from the group consisting of aluminum chlorhydroxide and complexes of aluminum chlorhydroxide and zirconyl hydroxychloride;

B. from about 0.2% to about 1% by weight of a suspending agent for the antiperspirant powder comprising a primary aliphatic amine having from about 12 to about 20 carbon atoms;

C. from about 3% to about 15% by weight of a non-toxic, non-aqueous carrier liquid of low volatility having emollient properties, said liquid being selected from the group consisting of lanolin, polysiloxanes of the formula $(-R_2{}^5Si\ O-)_n$ wherein R^5 is C_1–C_4 alkyl or phenyl and wherein said polysiloxanes have a viscosity at 25° C. of from 5 to about 2,000 centistokes, polyalkylene glycols containing a fatty acid or fatty alcohol group containing from about 2 to about 20 carbon atoms, fatty alcohols containing from about 12 to about 18 carbon atoms, fatty acid esters of aliphatic alcohols wherein said esters contain from about 12 to about 26 carbon atoms, mineral oil having a specific gravity of from about 0.8 to about 0.9 at 60° F., aliphatic hydrocarbons containing from about 12 to about 26 carbon atoms, multiple ester organic compounds of from about 12 to about 16 carbon atoms having a ratio of ester groups to carbon atoms of from about 0.125 to about 0.214 and having a solubility in water of from about 0.0005% to about 0.1% at 30° C., and mixtures thereof; and

D. from about 70.7% to about 93.9% by weight of an anhydrous, non-toxic, liquefiable propellant gas, under pressure.

4,018,889

OXYTETRACYCLINE COMPOSITIONS

William W. Armstrong, Mill Neck, N.Y., assignor to Pfizer Inc., New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,295

Int. Cl.² A61K *31/79, 31/65*

U.S. Cl. 424—80 **8 Claims**

1. An oxytetracycline composition comprising a solution in water of from about 1 to 40% by weight of an antibiotic compound selected from the group consisting of oxytetracycline and the pharmaceutically acceptable acid addition salts thereof, from about 0.8 to 1.3 molar proportion of a pharmaceutically acceptable magnesium compound soluble in said solution, and from about 10 to 50% by weight of 2-pyrrolidone, said composition having a pH value in the range of from about 7.5 to 9.5.

4,018,890

PYRAZOL-5-ONE PHARMACEUTICAL COMPOSITIONS AND METHODS FOR EFFECTING DIURESIS, SALURESIS AND FOR TREATING HYPERTENSION

Eike Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 9, 1974, Ser. No. 459,408

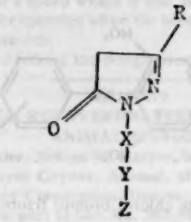
Disclosure was also published under Trial Voluntary Protest Program on Mar. 23, 1976.

Claims priority, application Germany, Apr. 17, 1973, 2319278

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 **68 Claims**

1. A pharmaceutical composition useful for effecting diuresis and saluresis and for treating hypertension in humans and animals which comprises a diuretic, saluretic or antihypertensive amount of a pyrazol-5-one of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is amino;

X is methylene wherein 1 hydrogen atom is substituted by lower alkyl, ethylene or ethylene wherein 1 hydrogen atom is substituted by lower alkyl or 1 hydrogen atom on each of the two carbon atoms is substituted by lower alkyl;

Y is a direct bond;

Z is aryl of 6 to 10 carbon atoms unsubstituted or substituted by:

a. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, and alkenoxy of 2 to 4 carbon atoms;

b. cycloalkyl of 5, 6 or 7 carbon atoms, or cycloalkenyl of 5, 6 or 7 carbon atoms;

c. nitro; or

d. nitro and 1 or 2 substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkenoxy of 2 to 4 carbon atoms, halogen and trifluoromethyl;

in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

4,018,891

PHARMACEUTICAL COMPOSITIONS AND METHODS OF TREATMENT WITH 1-OXO-1H-2-BENZOTHIO PYRAN-3-CARBOXYLIC ACID DERIVATIVES

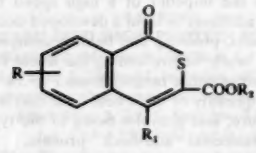
Thomas M. Bare, Milwaukee, and John T. Suh, Mequon, both of Wis., assignors to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 485,378, July 3, 1974, Pat. No. 3,960,892. This application Nov. 17, 1975, Ser. No. 632,241

Int. Cl.² A61K *31/35*

U.S. Cl. 424—275 **8 Claims**

1. The method of inhibiting the release of spasmogens from antigen- antibody reactions in an animal susceptible to extrinsic asthma, hay fever, urticaria, eczema or atopic dermatitis which comprises administering to said animal a safe and effective anti-allergy amount of a compound of Formula I:



I

in which R is hydrogen or lower alkoxy of 1 to 4 carbon atoms, R_1 is hydrogen or a lower alkyl of 1 to 4 carbon atoms, and R_2 is hydrogen or sodium.

4,018,892

BONE DEPOSITION BY 16-ARYL-13,14-DIHYDRO-PGE₂ P-BIPHENYL ESTERS

Alexander H. Walsh, Old Saybrook, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 602,478, Aug. 6, 1975, Pat. No. 3,982,016. This application Mar. 31, 1976, Ser. No. 672,449

Int. Cl.² A61K *31/34*

U.S. Cl. 424—285 **1 Claim**

1. A method for increasing bone deposition for the treatment of osteopenia which comprises administering to a subject afflicted with bone loss a bone deposition increasing amount of a 16-aryl-13,14-dihydro-PGE_2 p-biphenyl ester wherein the aryl group of said 13,14-dihydro-PGE_2 p-biphenyl ester is α- or β-furyl.

4,018,893

METHODS FOR TREATING MICROBIAL INFECTIONS

Martin Steinman, Livingston, N.J., assignor to Schering Corporation, Kenilworth, N.J.

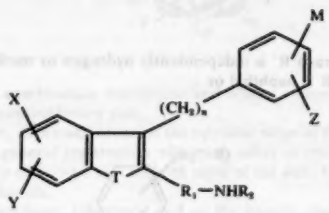
Continuation-in-part of Ser. No. 473,625, May 28, 1974, Pat. No. 3,944,672. This application Dec. 12, 1975, Ser. No. 640,291

Claims priority, application United Kingdom, May 22, 1975, 22371/75

Int. Cl.² A61K *31/34*

U.S. Cl. 424—285 **9 Claims**

1. A method for treating susceptible microbial infections, selected from the group consisting of bacterial, fungal and protozoal infections, which comprises administering to an animal species so infected an antimicrobially effective quantity of a compound represented by the formula:



wherein n is 0 or 1; R_2 is hydrogen, or amino lower alkylene having 1 to 3 carbon atoms; R_1 is carbonyl or lower alkylene having 1 to 3 carbon atoms with the proviso that when R_2 is hydrogen, R_1 is lower alkylene; T is 0; X is halogen, nitro, or trifluoromethyl; Y is hydrogen, halogen, methyl or trifluoromethyl; M is hydrogen, halogen or methyl with the proviso that when X is nitro, M is halogen; Z is hydrogen, halogen, nitro or methyl; or the acid addition salts thereof.

4,018,894

OXIME CARBONETES AS FUNGICIDAL OR BACTERICIDAL AGENTS

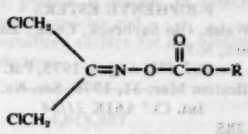
Don Robert Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 542,159, Jan. 20, 1975, Pat. No. 3,988,357. This application July 14, 1976, Ser. No. 705,224

Int. Cl.² A01N *9/24*

U.S. Cl. 424—301 **5 Claims**

1. A method of inhibiting the growth of bacteria which comprises applying thereto a bactericidally effective amount of a compound of the formula



in which R is alkyl having 1 to 6 carbon atoms.

4,018,895

ARYLOXYPHENYLPROPYLAMINES IN TREATING DEPRESSION

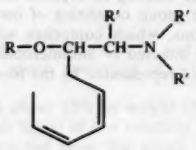
Bryan B. Molloy, and Klaus K. Schmiegel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 432,379, Jan. 19, 1974. This application Sept. 17, 1975, Ser. No. 614,094

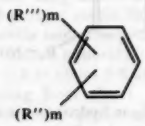
Int. Cl.² A61K *31/135*

U.S. Cl. 424—330 **2 Claims**

1. A method of treating human suffering from depression which comprises administering to said human an effective antidepressant dose of a compound of the formula:



wherein each R′ is independently hydrogen or methyl; wherein R is naphthyl or



wherein R″ and R‴ are halo, trifluoromethyl, C_1–C_4 alkyl, C_1–C_3 alkyloxy or C_3–C_4 alkenyl; and

wherein *n* and *m* are 0, 1 or 2; and acid addition salts thereof formed with a pharmaceutically-acceptable acid.

4,018,896

HALO-SUBSTITUTED -2,4,6-TRINITRODIPHENYLAMINES FOR CONTROL OF FOLIAR PHYTOPATHOGENS

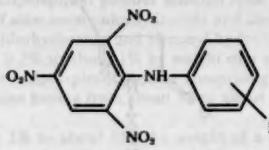
Reuben G. Jones, Cedar City, Utah, assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 13, 1974, Ser. No. 533,042

Int. Cl.² A01N *9/20*, *9/24*

U.S. Cl. 424—330 **9 Claims**

1. A method of inhibiting fungal pathogens on the foliage of plants which comprises applying to the pathogen or the foliage to be protected an effective fungus-inhibiting amount of a compound of the formula



wherein R represents chloro, bromo, fluoro or iodo, and *n* represents 1–3.

4,018,897

ANTIARRHYTHMIC AGENTS

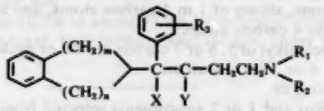
Bryan B. Molloy, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 485,488, July 3, 1974, Pat. No. 3,972,935. This application Mar. 15, 1976, Ser. No. 667,224

Int. Cl.² A61K *31/135*

U.S. Cl. 424—330 **4 Claims**

1. A method of treating cardiac arrhythmias comprising administering to a human subject suffering from an arrhythmia and in need of treatment a compound of the formula



wherein:

m is 0, 1, or 2; *n* is 0, 1, or 2; *m* + *n* is 2 or 3;

R_1 and R_2 independently are hydrogen, C_1-C_4 alkyl, lower alkenyl of the formula CH_2R_4, wherein R_4 is C_2-C_3 alkenyl,

R_3 is hydrogen, methyl, methoxy, trifluoromethyl, or halogen;

X and Y are both hydrogen, or taken together form a double bond; or

the pharmaceutically acceptable acid addition salts thereof; in the amount of about 0.005 to about 2.0 g. at intervals of about 4 to about 10 hours, either orally or parenterally.

4,018,898

METHOD OF USING POTATO SUPPLEMENT IN COMMERCIAL BREAD MAKING PROCESSES

Charles I. Tollefson, Rochester, N.Y.; Simon S. Jackel, Westport, Conn., and Jack K. Krum, Leawood, Kans., assignors to R. T. French Company, Rochester, N.Y.

Continuation of Ser. No. 430,180, Jan. 2, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,357

Int. Cl.² A21D *8/04*

U.S. Cl. 426—21 **6 Claims**

1. A method of extending the shelf-life of bread produced commercially by a continuous process of the type in which a broth is prepared from a mixture including yeast, nutrients, sugar and water and is fermented for a period of time before being mixed by the impeller of a high speed blender with wheat flour and additives to form a developed dough ready for extrusion into pans, proofing and baking, comprising

adding to the broth, before adding the wheat flour, a quantity of potato granules ranging from 1 to 3% by weight of the overall quantity of the wheat flour that is to be added to the mixture, said granules being of the type produced by the conventional "add-back" process,

adding to the broth containing the flour a quantity of water ranging in the ratios of from 2 to 1 to 5 to 1 by weight of the potato granules added to the broth, and

during the mixing of the flour and broth, operating the

blender at a speed which is less, than the speed at which the blender operates when the broth does not contain said potato granules,

proofing and baking the dough product.

4,018,899

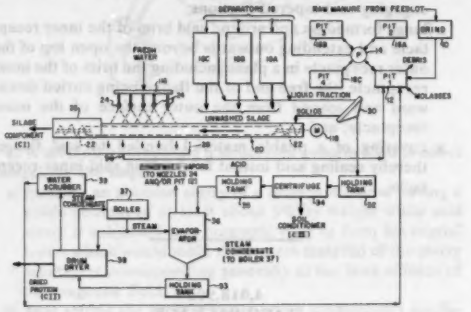
PROCESS FOR RECOVERING FEED PRODUCTS FROM ANIMAL MANURE

David W. Seckler; Judson M. Harper, both of Fort Collins, and William Wayne Gaynor, Atwood, all of Colo., assignors to Ceres Ecology Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 388,902, Aug. 16, 1973, Pat. No. 3,875,319. This application Jan. 22, 1975, Ser. No. 542,968

Int. Cl.² A23K *1/00*

U.S. Cl. 426—55 32 Claims



1. A process for extracting feed products from animal manure, comprising:

forming a manure-water slurry in a first pit and permitting said slurry to ferment;

separating said slurry into solid and liquid fractions, said solid fraction comprising a silage-like component of undigested fibers and grains, said liquid fraction comprising high protein nutrients and relatively dense indigestible minerals and fiber particles;

separating said relatively dense indigestible minerals and fiber particles from said high protein nutrients in the liquid fraction; and

processing said liquid fraction for use as a feed supplement which contains relatively low amounts of indigestible minerals and fiber particles.

4,018,900

FOOD BARS HAVING FORTIFIED MARSHMALLOW BASE

James R. Hayward, McHenry; William L. Keyser, East Dundee, and Walter J. Zielinski, Ingleside, all of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Aug. 2, 1976, Ser. No. 711,102

Int. Cl.² A23J *3/02;* A23G *3/00*

U.S. Cl. 426—72 16 Claims

1. Marshmallow, low in reducing sugars and containing from 1 percent to 20 percent by weight fat coated casein or caseinate salts.

4,018,901

STABILIZED HIGH PROTEIN FOOD BAR

James R. Hayward, McHenry; William L. Keyser, East Dundee, and Walter J. Zielinski, Ingleside, all of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Aug. 2, 1976, Ser. No. 710,452

Int. Cl.² A23J *3/02;* A23G *3/00*

U.S. Cl. 426—72 8 Claims

1. A marshmallow base product comprising marshmallow having a density of from 30 to 74 ounces per gallon non reducing sugar, and a high protein ingredient of reduced water binding capability said high protein ingredient including a heat treated protein or a fat coated protein or a combination of heat treated protein and fat coated protein; said heat treated protein being selected from the group consisting of animal protein, vegetable protein, casein caseinate salts and combinations thereof; said fat coated protein being selected from the group consisting of animal protein, vegetable protein, casein, caseinate salts and combinations thereof; said marshmallow base product having a water activity, A_w, less the 0.85 and a final density of from 111 to 119 ounces per gallon.

4,018,902

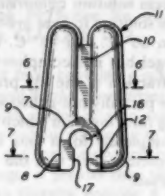
COMBINATION CONFECTION AND HOLDER

Edward Dee, 45 Georgian Court, Elizabeth, N.J. 07200

Filed June 30, 1976, Ser. No. 701,207

Int. Cl.² A23G *9/26;* A44B *17/00*

U.S. Cl. 426—75 1 Claim



1. A combination confection and holder comprising

a. a confectionary slab,

b. flat, depressed areas on the opposite sides of the slab, and in general registration with each other at one end of the slab defining a seat on both sides of the slab, for a handle,

c. a handle,

d. a resilient, bifurcated end on the handle, the bifurcated portions of which are deflectable and normally generally parallel; the bifurcated end defining a confection holder portion of the handle,

e. the bifurcated portions of the handle spaced apart a distance coequal to the thickness of the slab at the depressed areas of the slab, so that they may resiliently grip the slab and seat themselves on opposite sides of the slab,

f. each bifurcated portion shaped in correspondence to the shape of the depressed areas on the slab,

g. the bifurcated portions seated in the depressed areas, on opposite sides of the slab,

h. a raised, opposed area on the inner surface of each of the bifurcated portions of the handle,

i. a passage through the flat depressed areas of the slab, and shaped to receive the raised, opposed areas on the inner surfaces of the bifurcated portions of the handle, when the bifurcated portions of the handle are seated in the depressed areas, thereby forming an interlock between the handle and slab so that the bifurcated portions cannot be slid out of the depressed areas without deflecting and spreading the portions,

j. a channel through the depressed areas communicating between the edge of the slab and the passage,

k. the channel being narrower than the passage, to permit the insertion of the raised areas into the passage.

4,018,903

PROTEIN FIBERS

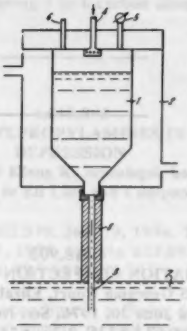
Antonius Johannes Maria Segeren, Rhoon, and Jelles Vincent Boskamp, Vlaardingen, both of Netherlands, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed Dec. 10, 1975, Ser. No. 639,281

Claims priority, application United Kingdom, Dec. 23, 1974, 55553/74

Int. Cl.² A23J 3/00

U.S. Cl. 426—104 13 Claims



1. A process for preparing soy protein fibers by spinning an aqueous soy protein solution comprising:

a subjecting the solution to heat pre-treatment at a temperature between 60° C. and 85° C. for a time sufficient to partially pregel but not completely gel the protein such that the 7S fraction of the soy protein is gelled; and

b extending the partially pre-gelled soy protein solution into a coagulating fluid medium which is not enough to gel the extrudate completely for a time sufficient to gel the extrudate completely such that the 11S fraction of the soy protein is gelled.

4,018,904

CONTAINER FOR AN INSTANT FOOD

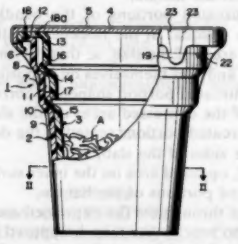
Keiji Muraoka, Nishinomiya, Japan, assignor to Acecook Co., Ltd., Osaka, Japan

Filed Nov. 26, 1975, Ser. No. 635,626

Claims priority, application Japan, Jan. 21, 1975, 50-10493[U]

Int. Cl.² B65B 29/06, 3/22

U.S. Cl. 426—115 7 Claims



1. A double-walled container for instant food comprising:

an outer receptacle of synthetic resin including a smooth peripheral side wall and having an open top and a closed bottom with two cylindrical portions near the open top of the outer receptacle; said cylindrical portions merging with each other through a tapered portion and the lower of the cylindrical portions merging with the remaining part of the receptacle by a second tapered portion;

said lower cylindrical portion having a plurality of inward projections formed circumferentially at intervals on the peripheral side wall of the outer receptacle, adjacent but spaced from said open top of the outer receptacle;

an inner receptacle of synthetic resin containing therein instant food, the inner receptacle including a lower corrugated peripheral side wall and having a closed bottom and a brim substantially flush with the open top of the outer receptacle, the apex of each corrugation being in contact with the peripheral side wall of the outer receptacle below said second tapered portion and forming an air space between the outer and inner receptacles;

two parallel annular ribs formed on the inner receptacle above the corrugated peripheral side wall, adjacent but spaced from said brim of the inner receptacle and defining therebetween an annular groove receiving said inward projections of the outer receptacle, thereby holding the inner receptacle within the outer receptacle; said ribs engaging said tapered portions;

a flange formed on and around said brim of the inner receptacle and extending outwards beyond the open top of the outer receptacle in a plane including the brim of the inner receptacle, the free end of the flange being curled downward and spaced from the outer surface of the outer receptacle; and

a covering of a pliable material bonded to said flange, thereby sealing said instant food within said inner receptacle.

4,018,905

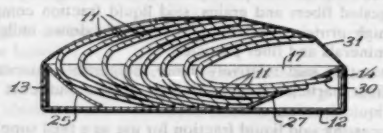
TACO PACKAGE

David J. Adamek, and John A. Anderson, both of Minneapolis, Minn., assignors to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Mar. 12, 1976, Ser. No. 666,434

Int. Cl.² B65B 23/00

U.S. Cl. 426—124 1 Claim



1. A package of folded taco shells, comprising:

an open top tray with a substantially rectangular bottom and vertical side and end walls, said end walls each having attached thereto an inwardly foldable flap positioned diagonally and downwardly from the top edge of said end wall panels to the top surface of said bottom panel;

a nested array of a plurality of said shells located within said tray, said shells folded approximately about a central axis allowing adjacent shells to be nested together with each shell having a rounded, closed end and an opposite open end thereby forming an array having a rounded closed end and an open end;

a first of said inwardly foldable flaps adjacent the open end of said array opposite said rounded end having formed therein a die cut opening with an upper edge;

at least the lower edge of the first of said taco shells in said array at the open end being inserted into said die cut opening and in contact with said upper edge to therefore restrict movement of the nested array;

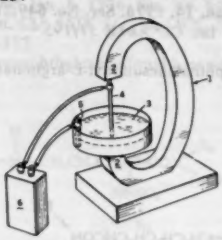
the opposite round end of said array being positioned against said inwardly folded flap opposite said flap with said die cut opening; and

a plastic film heat shrunk into close conformity with said array of shells and tray to firmly hold the package together and to center the array in the tray by forcing it down against the flaps and away from the end walls.

4,018,906
METHOD OF ALIGNING A PROTEIN SLURRY WITH A MAGNETIC FIELD TO PRODUCE A PROTEIN FOOD PRODUCT

James John Ostendorf, Affton, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed Apr. 21, 1976, Ser. No. 678,798
Int. Cl.² A23J *3/00*
U.S. Cl. 426—237 15 Claims



1. A method of preparing a structured protein food product comprising the steps of

a. freezing an aqueous slurry of a protein material having a solids content of at least about 5% by weight while said slurry is subjected to a magnetic field to form ice crystal layers which would mold the protein material of the slurry into layers corresponding generally to the lines of force of the magnetic field, and

b. heat setting the protein layers into a substantially insoluble form by heating the frozen slurry to a temperature sufficiently high to allow the protein layers to set and lower than a temperature at which the protein will degrade, thereby melting the ice crystal layers to form a structured protein food product.

4,018,907
COLORING FOOD WITH IRON-COMPLEXES

Richard J. Scarpellino, Ramsey, N.J., assignor to General Foods Corporation, White Plains, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,409
Int. Cl.² A23L *1/27*
U.S. Cl. 426—250 12 Claims

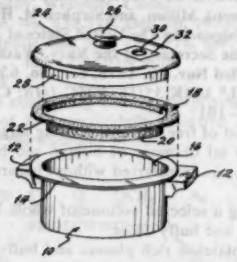
1. A method of imparting a red-hue color to edible materials which comprises adding to said edible materials a coloring composition consisting of at least one ferric salt complexed in situ or not with at least an equal weight amount of at least one 3 or 5-hydroxy, 4-pyrone-structured compound, in an amount effective to impart red color to said edible materials.

4,018,908
VACUUM TREATMENT TO REMOVE VAPORIZED LIQUID FROM UNFROZEN CELLULAR SUBSTANCES WHILE KEEPING THE CELL WALLS THEREOF INTACT

George E. Gross, 16601 Jean Lane, Tinley Park, Ill. 60477

Continuation of Ser. No. 221,503, Jan. 28, 1972, abandoned. This application Apr. 18, 1974, Ser. No. 461,839
Int. Cl.² A23L *1/31*
U.S. Cl. 426—281 3 Claims

1. A method of processing an unfrozen cellular substance having rupturable but unruptured cell walls containing cellular liquid, comprising the steps of vaporizing at least some of the cellular liquid in said unfrozen cellular substance by a combination of reduced pressure and temperature control at a rate which is not greater than the vapor transmission rate of said rupturable cell walls of the cellular substance in order to remove vaporized cellular liquid while keeping the cell walls intact, providing a pulsating reduced pressure of gradually increasing intensity during the vaporization by terminating without releasing the reduced pressure for a predetermined time interval, and then increasing the level of reduced pressure a predetermined number of times and thereafter introducing another liquid different from the cellular liquid in the cellular substance in place of the cellular liquid replaced therefrom.



4,018,909
SEMI-MOIST PET FOOD CONTAINING CORN MOLASSES

Peter H. Foulkes, Fox River Grove, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Nov. 20, 1975, Ser. No. 633,803
Int. Cl.² A23K *1/02*
U.S. Cl. 426—532 9 Claims

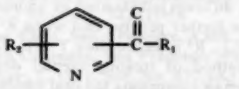
1. In a semi-moist pet food containing sugar, the improvement wherein the pet food further comprises about 3 percent to about 18 percent corn molasses as a replacement for at least part of the sugar and about 6 percent to about 30 percent sugar by weight of the pet food, provided however, that the weight percent of the sugar is greater than the weight percent of the corn molasses to thereby provide a pet food having improved palatability upon storage.

4,018,910
FLAVORING AGENT

Max Winter, Petit-Lancy; Fritz Gautschi, Commugny; Ivon Flament, and Max Stoll, both of Petit-Lancy, all of Switzerland, assignors to Firmenich & Cie, Geneva, Switzerland

Division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application June 24, 1974, Ser. No. 482,689
Int. Cl.² A23L *1/234*
U.S. Cl. 426—537 56 Claims

1. As a new composition of matter, a soluble coffee material having added thereto a minor, but flavor-modifying amount of a compound selected from the group of compounds having the general formula:



wherein R_1 is hydrogen, methyl, or phenyl and R_2 is hydrogen, methyl or acetyl.

4,018,911
METHOD FOR LARGE VOLUME FREEZING AND THAWING OF PACKED ERYTHROCYTES

Fabian J. Lionetti, Milton, and Stephen M. Hunt, Allston, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 10, 1975, Ser. No. 630,558
Int. Cl.² A61K *35/18;* **F25C** *1/18;* **C12K** *9/00*
U.S. Cl. 424—101 **4 Claims**

1. A method of freezing and thawing large volumes on the order of 400 ml or more of human red blood cells which thereafter may be transferred without hazard to the recipient comprising:

centrifuging a selected volume of whole blood to separate platelets and buffy coats;

removing platelets rich plasma and buffy coats by forcing topmost fluid and cell layers under pressure out of the blood container;

transferring the remaining cells to a freezing bag susceptible of being spread substantially flat to a desired area and spacing of the major surfaces;

adding hydroxyethyl starch to the platelet-free plasma in a proportion substantially of 142 ml of hydroxyethyl starch, 40% weight/volume, plus 263 ml of packed cells plus plasma;

mixing the hydroxyethyl starch and the plasma in a satellite container;

forcing the hydroxyethyl starch-plasma solution into the freezing bag containing the packed cells and mixing the constituents by repeated inversion;

forcing air bubbles back into the satellite bag and sealing the freezing bag; and

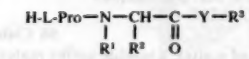
placing the bag in a cryoholder adapted for rapid heat transfer and immersing the cryoholder in a liquid nitrogen bath for an interval on the order of from 1 to 1½ minutes while shaking at a rate of substantially 160 cpm.

4,018,912
TRIPEPTIDE DERIVATIVES WITH CENTRAL NERVOUS SYSTEM ACTIVITY AND PREPARATION THEREOF

Amedeo Failli, Montreal; Hans U. Immer, Mount Royal, and Manfred Gotz, Hudson, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed July 28, 1975, Ser. No. 599,450
Int. Cl.² A61K *37/00;* **C07C** *103/52*
U.S. Cl. 424—177 **21 Claims**

1. A compound of formula 1



1

in which R^1 is hydrogen, lower alkyl or NR^4R^5 wherein R^4 and R^5 each are lower alkyl; R^2 is hydrogen or lower alkyl; R^3 is amino, lower alkylamino, di(lower)alkylamino or amino(lower)alkylamino, and Y is one of the amino acid residues Gly or D—Ala with the proviso that when R^1 is NR^4R^5 is lower alkylamino, di(lower)alkylamino or amino(lower)alkylamino and with the further proviso that when R^1 is hydrogen, R^2 is $CH_2CH(CH_3)_2$, R^3 is amino then Y is D—Ala.

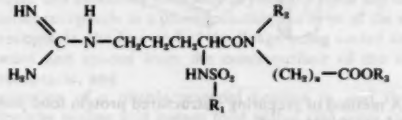
19. A method of treating mental depression in warm-blooded animals comprising the oral administration thereto of 0.25–100 mg/kg of a compound of formula 1 as claimed in claim 1 or a pharmaceutically acceptable acid addition salt thereof.

4,018,913
N²-ALKOXYNAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, Kobe; Ryoji Kikumoto; Kazuo Ohkubo, both of Tokyo; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo; Yoshikuni Tamao, Yokohama, and Akiko Hijikata, Kobe, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo and Shosuke Okamoto, both of, Japan

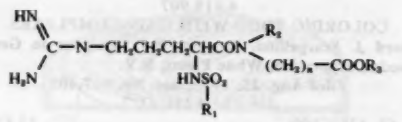
Filed Jan. 14, 1976, Ser. No. 649,219
Int. Cl.² A61K *31/195*
U.S. Cl. 424—177 **5 Claims**

1. N^2-alkoxynaphthalenesulfonyl-L-argininamides having the formula:



and the pharmaceutically acceptable salts thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is C_5–C_{10} alkylthioalkyl; R_3 is hydrogen, and n is an integer of 1, 2 or 3.

5. A method for inhibiting activity and suppressing activation of thrombin in vivo which comprises introducing into a living body a pharmaceutically effective amount of an N^2-alkoxynaphthalenesulfonyl-L-argininamide having the formula:



or the pharmaceutically acceptable salts thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is C_5–C_{10} alkylthioalkyl; R_3 is hydrogen, and n is an integer of 1, 2 or 3.

4,018,914
PARTURITION INDUCEMENT

Edwin Samuel Johnson, Antioch, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 13, 1975, Ser. No. 631,773
Int. Cl.² A61K *37/02*
U.S. Cl. 424—177 **4 Claims**

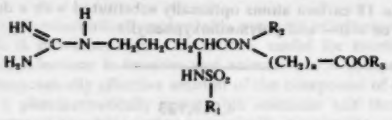
1. The process of inducing parturition essentially consisting in administering to a warm-blooded animal within the last 10% of its gestation period, an effective amount of a compound of the formula L-pGlu-L-His-L-Trp-L-Ser-L-Tyr-D-X-L-Leu-D-X-L-Leu-L-Arg-L-Pro-NH-alkyl wherein X stands for an aminoacid moiety of the formula —NH—CHR′—CO— and R′ stands for a linear or branched alkyl of 1–4 carbons.

4,018,915
N^2-ALKOXYNAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, Kobe; Ryoji Kikumoto; Kazuo Ohkubo, both of Tokyo; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo; Yoshikuni Tamao, Yokohama, and Akiko Hijikata, Kobe, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo and Shosuke Okamoto, both of, Japan

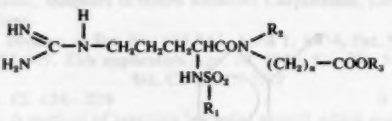
Filed Jan. 5, 1976, Ser. No. 646,522
Int. Cl.² A61K *31/195*; C07C *101/72*
U.S. Cl. 424—177 4 Claims

1. N^2-alkoxynaphthalenesulfonyl-L-argininamides having the formula:



and the pharmaceutically acceptable salts thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is C_7–C_{15} phenylalkyl; R_3 is hydrogen, C_1–C_{10} alkyl, and n is an integer of 1, 2 or 3.

4. A method for inhibiting activity and suppressing activation of thrombin in vivo, which comprises introducing into a living body a pharmaceutically effective amount of an N^2-alkoxynaphthalenesulfonyl-L-argininamide having the formula:



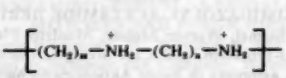
or the pharmaceutically acceptable salts thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is C_7–C_{15} phenylalkyl; R_3 is hydrogen; and n is an integer of 1, 2 or 3.

4,018,916
ANTIVIRAL IONIC COMPLEXES OF DOUBLE-STANDARD RNA

Richard Anthony Vere Hodge, Dorking, England, assignor to Beecham Group Limited, United Kingdom

Division of Ser. No. 544,211, Jan. 12, 1975. This application June 25, 1975, Ser. No. 590,033
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 8 Claims

1. A pharmaceutical composition useful for treating susceptible DNA and RNA viral infections which comprises an antiviral amount of an antiviral substance which is a principally ionic complex in which the cations are organic polymer polycations which contains a repeat unit of formula (I):



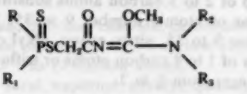
wherein m and n are the same or different and each is an integer from 3 to 5 and the anions are either (a) double-stranded ribonucleic acid polyanions, said double-stranded ribonucleic acid being of natural origin or (b) polyanions of a double-stranded N-oxide or alkali modified derivative of a double-stranded ribonucleic acid of natural origin, in combination with a pharmaceutically acceptable non-toxic diluent or carrier.

4,018,917
ISOUREA ACETYLPHOSPHATE INSECTICIDES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 639,318, Dec. 10, 1975, Pat. No. 3,984,410. This application May 13, 1976, Ser. No. 686,182
Int. Cl.² A01N *9/36*
U.S. Cl. 424—200 21 Claims

1. A method of controlling insects comprising applying to the habitat thereof an insecticidally effective amount of a compound having the formula



wherein R is lower alkoxy, R_1 is lower alkyl or lower alkoxy, R_2 is allyl or lower alkyl, and R_3 is selected from the group consisting of allyl, lower alkyl, phenyl, benzyl, and 3-methylphenyl; or R_2 and R_3 taken together are $-CH_2(CH_2)_3CH_2-$ or $-CH_2CH_2OCH_2CH_2-$.

4,018,918
TOPICAL CLINDAMYCIN PREPARATIONS

Donald E. Ayer; Carl A. Schlagel, both of Kalamazoo, and Gordon L. Flynn, Ann Arbor, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 579,177, May 20, 1975, Pat. No. 3,980,778, which is a continuation of Ser. No. 409,427, Oct. 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 316,973, Dec. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 233,337, March 9, 1972, abandoned. This application Mar. 19, 1976, Ser. No. 668,389
Int. Cl.² A61K *31/56*
U.S. Cl. 424—240 10 Claims

1. A therapeutic composition for topical or local application for treatment of affected dermatosis comprising an anti-inflammatory therapeutic amount of 6α,9α-difluoro-11β, 17α,21-trihydroxy-16β-methylpregna-1,4-diene-3,20-dione 17,21-diacetate, an antibacterial therapeutic amount of clindamycin or pharmaceutically acceptable salt or ester thereof and an antifungal therapeutic amount of chloroxine in association with a pharmaceutical carrier.

4,018,919
SEQUENTIAL CONTRACEPTIVE METHOD USING TWO TYPES OF PROGESTATIONAL AGENTS

Larry J. Black, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 16, 1975, Ser. No. 596,542
Int. Cl.² A61K *31/565*
U.S. Cl. 424—242 7 Claims

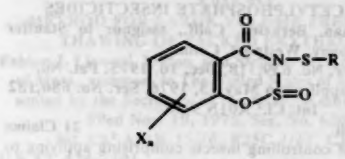
1. A method of contraception for female mammals which comprises the administration to a female mammal of a Type B progestin during the follicular phase of the sexual cycle and a Type A progestin during the luteal phase fo the sexual cycle, at dose levels sufficient to prevent conception.

4,018,920
3-HALOHYDROCARBYLTHIO-1,2,3-BENZOXATHIAZIN-4-(3H)-ONE 2-OXIDES

David Cheong King Chan, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Apr. 1, 1976, Ser. No. 672,683
Int. Cl.² C07D *291/08*; A01N *9/14*, *15/00*
U.S. Cl. 424—246 7 Claims

1. A compound of the formula



wherein R is an alkyl group of 1 to 3 carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35 or an alkenyl group of 2 to 3 carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35; X is halogen of atomic number 9 to 35, nitro, cyano, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or trifluoromethyl and *n* is 0 or an integer from 1 to 3.

4,018,921

SUBSTITUTED PHENYLGLYCYLCEPHALOSPORINS

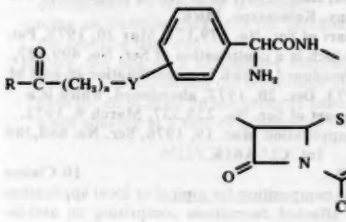
John Gerald Gleason, Cornwells Heights, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 384,771, Aug. 1, 1973, Pat. No. 3,953,439. This application Dec. 15, 1975, Ser. No. 641,065

Int. Cl.² C07D *501/22, 501/32*

U.S. Cl. 424—246 **20 Claims**

1. A compound of the formula:



in which:

Y is O, NH or S;

n is one to five;

R is NH_2 or OR′, where R′ is hydrogen or lower alkyl of from one to four carbon atoms;

M is hydrogen or an alkali metal or ammonium cation; and

A is hydrogen, acetoxy or pyridyl.

11. A pharmaceutical composition comprising an antibacterially effective amount of a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

16. A method of treating bacterial infections comprising administering by injection to a warm-blooded animal a pharmaceutical composition comprising an effective but nontoxic dose of a compound as claimed in claim 1 and a pharmaceutical carrier therefor.

4,018,922

10-(PIPERIDIN O-ALKYL)-PHENOTHIAZINES

Pierre Henri Derible, Le Perreux, and Jean-Paul Lavaux, Paris, both of France, assignors to Roussel-UCLAF, Paris, France

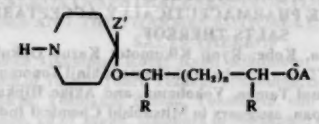
Division of Ser. No. 497,995, Oct. 19, 1973, Pat. No. 3,891,636, which is a continuation-in-part of Ser. No. 252,461, May 11, 1972, abandoned. This application Mar. 25, 1975, Ser. No. 561,925

Claims priority, application France, Nov. 9, 1972, 72.39673; Sept. 3, 1973, 73.31698; May 14, 1971, 71.17509; May 14, 1971, 71.17510

Int. Cl.² A61K *31/445, 31/54*

U.S. Cl. 424—247 **8 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, Z′ is selected from the group consisting of hydrogen and alkyl of 1 to 10 carbon atoms, *n* is 0, 1 or 2 and A is selected from the group consisting of hydrogen, $-COOR_2$ and $-COR_1$, R_2 is linear alkyl of 1 to 15 carbon atoms and R_1 is selected from the group consisting of alkyl of 1 to 18 carbon atoms optionally substituted with a double bond or —O— and polymethoxyphenyl.

4,018,923

5,6-DIARYL-1,2,4-TRIAZINES AS TOPICALLY-ACTIVE ANTI-INFLAMMATORY AGENTS

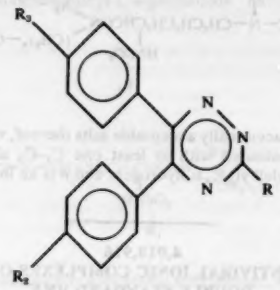
William B. Lacefield, Indianapolis, and Peter P. K. Ho, Carmel, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 10, 1976, Ser. No. 665,589

Int. Cl.² A61K *31/53*

U.S. Cl. 424—249 **9 Claims**

1. A method of treating inflammation in a warm-blooded mammal which comprises topically administering to such mammal an effective amount of a compound of the formula,



wherein R is hydrogen or $-(X)_nR_1$, in which X is either O or S, *n* is an integer which is either 0 or 1, and R_1 is C_1-C_8 alkyl, C_7-C_8 aralkyl, C_3-C_8 cycloalkyl, or C_4-C_8 (cycloalkyl)alkyl; and R_2 and R_3 independently are halo, C_1-C_3 alkyl, C_1-C_3 alkoxy, or di(C_1-C_3 alkyl)amino, with the proviso that at least one of R_2 and R_3 is halo or C_1-C_3 alkyl; and a pharmaceutically-acceptable acid addition salt of basic members thereof.

4,018,924

PHENYL-IMIDAZOLYL-ACETAMIDE DERIVATIVES

Karl Heinz Buchel; Werner Meiser; Manfred Plempel, all of Wuppertal-Elberfeld, and Carl Metzger, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

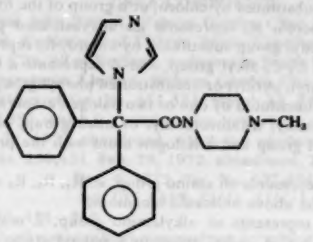
Continuation of Ser. No. 336,025, Feb. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 38,531, May 18, 1970, Pat. No. 3,732,242. This application Jan. 9, 1975, Ser. No. 539,871

Claims priority, application Germany, May 21, 1969, 1925994

Int. Cl.² C07D *401/02*

U.S. Cl. 424—250 **3 Claims**

1. The compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof.

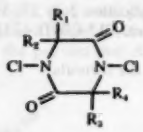
2. A pharmaceutical composition useful for treating mycotic infections in humans and animals which comprises an antimycotically effective amount of the compound of claim 1 or a pharmaceutically acceptable nontoxic salt thereof in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

4,018,925
METHOD OF ARRESTING BACTERIAL GROWTH WITH CERTAIN SELECTED DICHLORO-2,2,5,5-TETRASUBSTITUTED-3-6-PIPERAZINEDIONES

Nicolae S. Bodor, and James J. Kaminski, both of Lawrence, Kans., assignors to Interx Research Corporation, Lawrence, Kans.

Division of Ser. No. 456,743, April 1, 1974, Pat. No. 3,891,649. This application Apr. 10, 1975, Ser. No. 566,743
Int. Cl.² A01N 9/22
U.S. Cl. 424—250 6 Claims

1. A method of arresting bacterial growth which comprises applying to the same, an effective antibacterial amount of a compound of the formula:



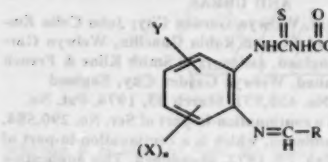
wherein R_1, R_2, R_3, and R_4 are the same or different, and represent a member selected from the group consisting of an alkyl group of from 1 to 20 carbon atoms, a phenyl group, and a naphthyl group.

4,018,926
ALKYL 4-[O-(SUBSTITUTED METHYLENEAMINO)-PHENYL]-3-THIOALLOPHANATE MITICIDES AND FUNGICIDES

Joel Benjamin Wommack, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 473,156, May 24, 1974, Pat. No. 3,958,007, and a continuation-in-part of Ser. No. 865,947, Oct. 13, 1969, Pat. No. 3,836,569. This application Jan. 13, 1976, Ser. No. 648,760
Int. Cl.² A01N 9/22
U.S. Cl. 424—258 14 Claims

1. A method of preventing injury due to mites or fungi comprising applying to the locus to be protected from fungi and mites a pesticidally effective amount of a compound of the formula:



wherein

X is hydrogen, fluorine, chlorine, or bromine;

Y is hydrogen or alkyl of 1 to 4 carbon atoms;

R_1 is alkyl of 1 to 12 carbon atoms;

R is thienyl; furyl; naphthyl; pyridyl; quinolyl; alkyl of 1 to 12 carbon atoms; alkoxy of 1 to 3 carbon atoms or

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms;

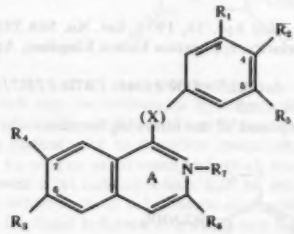
R_3 is alkyl of 1 to 4 carbon atoms, provided that R_2 and R_3 can be taken together and be $-CH_2CH_2OCH_2CH_2-$ or $-(CH_2)_m-$; when Y is alkyl, n is O; when Y is hydrogen, n is 1, 2 or 3; m is 4 to 6; and the sodium, potassium, lithium, calcium, barium, copper, zinc and manganese salts of these compounds.

4,018,927
TREATMENT OF PROLIFERATING SKIN DISEASES WITH PAPAVERINE ALKALOIDS

John J. Voorhees, Ann Arbor, Mich., assignor to The Regents of the University of Michigan, Ann Arbor, Mich.

Continuation of Ser. No. 425,339, Dec. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 324,012, Jan. 16, 1973, abandoned. This application Nov. 20, 1975, Ser. No. 633,646
Int. Cl.² A61K 31/485
U.S. Cl. 424—260 4 Claims

1. A process for treating proliferating skin diseases comprising the administration of an effective amount of a compound of the formula:



wherein X is carbonyl or $(CH_2)_n$ and n is zero or one; R_1 is hydroxy, methoxy, ethoxy or ethyl; R_2, R_3, and R_4 are hydrogen, hydroxy, methoxy or ethoxy; R_5 is hydrogen or ethoxy; R_6 is hydrogen or methyl; and R_7 is nothin, hydrogen or methyl and provided that when R_7 is hydrogen or methyl, the double bonds indicated in the A ring are saturated, in association with a pharmaceutical carrier to a human or animal having a proliferating skin disease.

4,018,928
PYRIDYL SUBSTITUTED AMINOALKYL-THIOUREAS AND UREAS

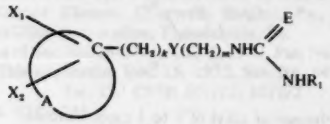
Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 450,931, March 13, 1974, Pat. No. 3,932,427, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Oct. 29, 1975, Ser. No. 626,682

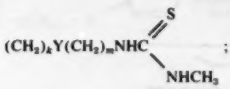
Int. Cl.² A61K *31/44*

U.S. Cl. 424—263 **11 Claims**

1. A pharmaceutical composition to inhibit H-2 histamine receptors, said composition being suitable for oral or parenteral administration, comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a pyridyl compound of the formula:



wherein A is such that there is formed together with the carbon atom shown a pyridine ring; X_1 is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, halogen, amino or



X_2 is hydrogen or when X_1 is lower alkyl, lower alkyl or halogen; k is 1 or 2 and m is 2 or 3, provided that the sum of k and m is 3 or 4; Y is NH; E is oxygen or sulphur; R_1 is hydrogen, lower alkyl, or dimethylaminoethyl or a pharmaceutically acceptable addition salt thereof.

4,018,929
3-LOWERALKYLCARBAMYLSULFONAMIDO-4-PHENYLAMINOPYRIDINE-N-OXIDES, DERIVATIVES THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Jacques E. Delarge, Dolembreux; Charles L. Lapiére, Tongeren, and André H. Georges, Ottignies, all of Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium

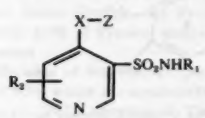
Filed Apr. 16, 1975, Ser. No. 568,759

Claims priority, application United Kingdom, Apr. 17, 1974, 16836/74

Int. Cl.² A61K *31/44*; **C07D** *213/71*

U.S. Cl. 424—263 **8 Claims**

1. A compound of the following formula:



(I),

in which

X represents an amino or C_1-C_4-alkylamino group;

R_1 represents a group of the formula:

R_3NHCA (II),

where A represents oxygen or sulfur and R_3 represents a C_1-C_4-alkyl, allyl, cyclohexyl, unsubstituted phenyl group or a phenyl group substituted by chloro, or a group of the formula R_4CO(III), wherein R_4 represents an unsubstituted phenyl group or a phenyl group substituted by chloro; R_2 represents hydrogen or a C_1-C_4-alkyl group, and Z represents a C_1-C_4-alkyl, methylfuryl, pyridyl or unsubstituted phenyl group, or a phenyl group substituted by one or two halogen atoms or by a C_1-C_4-alkyl, alkoxy, trifluoromethyl or nitro group, or by a trifluoromethyl group and a halogen atom with the provisos that:

1. when X represents an amino group, Z, R_1, R_2, R_3 and R_4 have all the above indicated meanings;
2. when X represents an alkylamino group, Z may only represent a C_1-C_4-alkyl group or a phenyl group as defined hereabove and R_1 may further represent a group of the formula:

R_5CO (IV)

in which R_5 represents hydrogen or a C_1-C_4-alkyl group;

3. when X represents an amino group and Z is other than a phenyl group, R_1 may further represent hydrogen or a group of the formula (IV) as above defined,

as well as a pyridine N-oxide of the compound of formula I and the pharmaceutically acceptable base and acid addition salts of said compounds.

8. A pharmaceutical composition containing an anti-inflammatory or diuretic effective amount of a compound of claim 1 and a pharmaceutical carrier or vehicle.

4,018,930
SUBSTITUTED INDOLOBENZAZEPINES

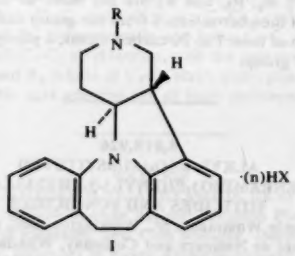
Joel G. Berger, Freeport, N.Y., assignor to Endo Laboratories, Inc., Garden City, N.Y.

Continuation-in-part of Ser. No. 422,615, Dec. 6, 1973, abandoned. This application July 17, 1975, Ser. No. 596,851

Int. Cl.² C07D *471/16*

U.S. Cl. 424—267 **16 Claims**

1. Compounds of the formula



I

wherein

n is zero or one;

X is the anion of a pharmaceutically suitable acid; and

R is 3-chloro-2-butenyl: C_3-C_8 oxoalkyl side chain; phenacyl; 3-oxo-3-phenylpropyl; C_3-C_5 alkenyl; C_3-C_5 alkynyl; or C_6-C_8 cycloalkenylmethyl; and

the hydrogens in the 4*a* and 14*a* positions are in trans relationship to each other.

4,018,931
PHARMACOLOGICALLY ACTIVE THIOUREA AND UREA COMPOUNDS

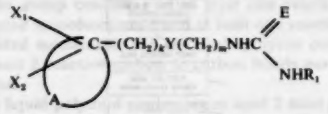
Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 451,333, March 14, 1974, Pat. No. 3,950,353, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,494

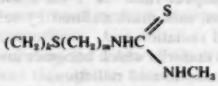
Int. Cl.² A61K *31/41, 31/415*

U.S. Cl. 424—269 **10 Claims**

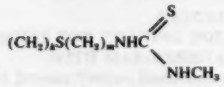
1. A pharmaceutical composition to inhibit H-2 histamine receptors comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a heterocyclic compound of the formula:



wherein A is such that there is formed together with the carbon atom shown an unsaturated heterocyclic nucleus, said unsaturated heterocyclic nucleus being an imidazole or pyrazole ring; X_1 is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, benzyl, halogen, amino or



X_2 is hydrogen or when X_1 is lower alkyl, lower alkyl or halogen; k is 0 to 2 and m is 2 or 3, provided that the sum of k and m is 3 or 4; Y is oxygen, sulphur or NH; E is oxygen or sulphur; and R_1 is hydrogen, lower alkyl, benzoyl or di-lower alkylamino-lower alkyl or a pharmaceutically acceptable addition salt thereof with the proviso that X_1 is



only when Y and E are sulphur and R_1 is methyl and with the proviso that when X_1 is other than hydrogen or lower alkyl and X_2 is other than hydrogen, X_1 and X_2 are attached at carbon atoms.

4,018,932
ANTHELMINTIC POUR-ON FORMULATIONS FOR TOPICAL USE ON DOMESTIC AND FARM ANIMALS

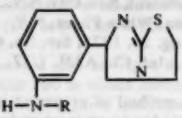
Larry Dean Spicer, Princeton; James Michael Quinlan, Trenton, and Harold Berger, Lawrenceville, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 3, 1975, Ser. No. 628,458

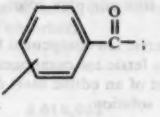
Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **13 Claims**

1. A method for the control of helminths infecting homothermic domestic and farm animals comprising, directly contacting the skin of said animals with a solution containing an anthelmintically effective amount of (a) a compound of the formula:



wherein R is selected from the group consisting of lower alkanoyl and



X is selected from the group consisting of hydrogen and halogen, or (b) the racemic (dl) mixtures or (c) an optically active levorotatory isomer thereof; and wherein said compound is the free base or an acid addition salt thereof.

4,018,933
ACYLAMINOPENICILLANIC ACIDS AND PROCESS FOR PREPARING THEM

Manfred Schorr, Frankfurt am Main; Elmar Schrinner, Wiesbaden, and Wilfried Schmitt, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

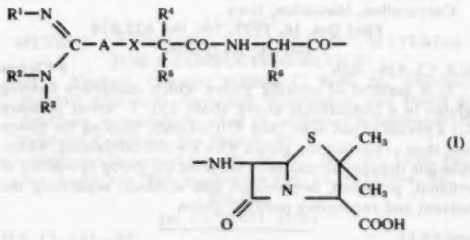
Filed Dec. 11, 1975, Ser. No. 639,807

Claims priority, application Germany, Dec. 13, 1974, 2458973

Int. Cl.² C07D *499/68, 499/70;* **A61K** *31/43*

U.S. Cl. 424—271 **16 Claims**

1. Acylaminopenicillanic acids of the general formula I



in which R^1, R^2 and R^3 represent hydrogen or lower alkyl radicals which may be substituted by lower alkoxy and in which the radicals R^1 and R^2 or R^2 and R^3 may form together an alkylene radical of 2 to 4 carbon atoms which may be interrupted by oxygen or nitrogen and which may be substituted by lower alkyl radicals which may be interrupted by oxygen and wherein these substituents of the alkylene ring may further be closed to form a ring which may be interrupted by oxygen;

R^4 and R^5 represent hydrogen or lower alkyl,

R^6 represents phenyl which may be substituted by hydroxyl, lower alkyl, lower alkoxy or halogen; dihydrophenyl; or thienyl, furyl or pyridyl which may be substituted by lower alkyl or lower alkoxy;

A represents a benzene or thiophene ring which may be substituted by lower alkoxy, haogen or lower alkyl, and

X represents oxygen or a single bond.

4,018,934

STABILIZATION OF IRON - COMPLEX COLORS

Thomas Holden Parliment, New City, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,321
Int. Cl.² A23L *1/27*
U.S. Cl. 426—540 13 Claims

1. An improved method of preparing iron-complex colors comprised of a ferric ion component and a non-ferric component selected from the group consisting of those phenols, α-hydroxy carboxylic acids, esters of α-hydroxy carboxylic acids, ethers of α-hydroxy carboxylic acids, 3-hydroxy-4-pyrone-structured compounds, and 5-hydroxy-4-pyrone-structured compounds effective to complex with said ferric ion to produce an iron-complex color, wherein the improvement comprises:

a. forming one ferric ion component by preparing a solution comprising the ferric ion component and at least an equal weight amount of an edible inert diluent; and

b. co-drying the solution.

4,018,935

COMMINUTED MEAT PRODUCT AND METHOD OF PREPARING SAME

Benjamin John Catlin, Rushden, and Tegwyn Pierce Williams, Great Doddington near Wellingborough, both of England, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Continuation of Ser. No. 465,576, April 30, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,450
Claims priority, application United Kingdom, May 4, 1973, 21232/73
Int. Cl.² A23L *1/31*
U.S. Cl. 426—646 7 Claims

5. A method for reducing shrinkage of comminuted meat products during heating comprising mixing, prior to heating, comminuted meat and 1–10% by weight dried potato pulp based on the wet weight of meat, wherein said potato pulp has had 75–100% of its starch removed.

4,018,936

GLUTEN TREATMENT

John T. Garbutt; Ronald C. Malzahn, and Alpha L. Morehouse, all of Muscatine, Iowa, assignors to Grain Processing Corporation, Muscatine, Iowa

Filed Oct. 16, 1975, Ser. No. 622,874
Int. Cl.² A23J *3/00*
U.S. Cl. 426—656 5 Claims

1. A method of treating gluten which comprises heating gluten to a temperature above about 255° F. under pressure for a period of not more than 420 seconds, filtering the gluten and then extracting the gluten with a water-containing, water-miscible organic solvent selected from the group consisting of ethanol, propanol, isopropanol and acetone, separating the solvent and recovering purified gluten.

4,018,937

ELECTRON BEAM RECORDING COMPRISING POLYMER OF 1-METHYLVINYL METHYL KETONE

Aaron William Levine, Kendall Park, and Michael Kaplan, Franklin Township, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 314,975, Dec. 14, 1972, abandoned. This application Aug. 14, 1975, Ser. No. 604,707
Int. Cl.² B05C *5/00*; G03C *1/68*
U.S. Cl. 427—43 7 Claims

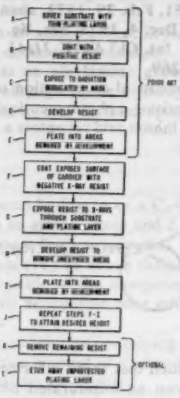
1. In a method of recording information whereby a modulated beam of electrons is scanned across a surface of a resist material which becomes more soluble in a developer solvent when impinged upon by the beam of electrons and the resist material is developed with the developer solvent so as to remove the solubilized portions thereof, the improvement which comprises employing as the resist material a polymer of 1-methylvinyl methyl ketone.

4,018,938

FABRICATION OF HIGH ASPECT RATIO MASKS

Ralph Feder, Hyde Park, and Eberhard A. Spiller, Mount Kisco, both of N.Y., assignors to International Business Machines Corporation, Yorktown Heights, N.Y.

Filed June 30, 1975, Ser. No. 591,986
Int. Cl.² B05D *3/06*
U.S. Cl. 427—43 18 Claims



1. A method of manufacturing a mask characterized by an aspect ratio > 1 comprising the steps of:

a. providing a mask of aspect ratio ≤ 1 on a substrate transparent to radiation, said mask defined by selective areas absorbent of said radiation and,

b. coating said mask with material which becomes insoluble in a developer in response to said radiation,

c. exposing said mask and said material to said radiation with said substrate located between said mask and a source of said radiation,

d. developing said material, and

e. plating masking material absorbent to said radiation in areas in which said radiation responsive material was removed by said developing whereby the height of said radiation absorbent masking material is increased to thereby increase the aspect ratio of said mask.

4,018,939

METHOD OF RENDERING SURFACES NONFOGGING

Richard E. Merrill, Wakefield, and Arthur A. Massucco, Natick, both of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 309,332, Nov. 24, 1972, Pat. No. 3,935,367. This application May 15, 1975, Ser. No. 577,701
Int. Cl.² B05D *3/06*
U.S. Cl. 427—54 18 Claims

1. A method for improving adhesion of urethane-acrylic block copolymer nonfogging film coatings to polymeric substrate surfaces, comprising the step of subjecting said substrate to exposure to UV light in an amount of at least about 20 watts per square inch.

4,018,940

PROCESS FOR FORMING SOLDER RESISTANT PHOTORESIST COATINGS

Charles R. Morgan, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 330,818, Feb. 8, 1973, Pat. No. 3,925,320, which is a continuation-in-part of Ser. No. 250,554, May 5, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,719

Int. Cl.² B05D 3/06

U.S. Cl. 427—54 8 Claims

1. A process of forming a solder resistant photoresist on a printed circuit board which comprises:

A. applying to the electrically conductive surface of a printed circuit board having holes therethrough a solid layer of a solder resistant photocurable composition consisting essentially of

1. a solid polyene which is a reaction product of a styrene-allyl alcohol copolymer and a member selected from the group consisting of at least one reactive unsaturated monoisocyanate and at least one reactive unsaturated monocarboxylic acid, said polyene containing at least 2 reactive carbon to carbon bonds per molecule; and

2. a liquid polythiol containing at least 2 thiol groups per molecule, the total combined functionality of (a) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4;

B. imagewise exposing selected areas of said composition to actinic radiation, thereby curing the exposed areas of said composition;

C. removing the unexposed uncured areas of the curable composition, thereby exposing the surface of said printed circuit board beneath the removed uncured areas of the composition

D. inserting the leads of electrical components where desired through the holes in the bared areas of the printed circuit board;

E. passing the printed circuit board over a flux bath, and thereafter over a solder bath maintained at a temperature in the range of 400° to 600° F, thereby soldering said electrical components to said board; and

F. removing the cured solder resistant composition from said board.

4,018,941

PROCESS FOR COATING POLYMERIC SUBSTRATES WITH MAR-RESISTANT COATING

Robert Jerome Tucker, Hackettstown, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 18, 1976, Ser. No. 687,576

Int. Cl.² B05D 3/06; C08K 5/13

U.S. Cl. 427—55 10 Claims

1. A process for coating a polymeric substrate comprising,

A. continuously contacting a clean, dust-free polymeric substrate with a mar-resistant coating composition having a viscosity of from about 50 to about 95 centipoises at room temperature, for from about 2 to about 7 minutes,

B. continuously removing the resultant coated substrate from said coating composition,

C. allowing said coating on said substrate to level, with evaporation of solvent, for from about 30 seconds to about 3 minutes, and

D. curing the resultant leveled coating by subjecting it to radiant heat at a temperature of from about 50° C. to about 130° C. for from about 1 to about 20 minutes, said mar-resistant coating composition consisting essentially of a mixture of (1), (2), (3) and (4), in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2 respectively in which,

a. is an isocyanate-terminated urethane which is the reaction product of a mixture consisting essentially of (I) and (II), at a molar ratio of 1:2 respectively in which

I. is a saturated diol having a molecular weight of from about 200 to about 3,000, and

II. is a saturated organic isocyanate, (b) is a monomeric, sterically bulky, polyhydric alcohol containing 2–6 hydroxyl groups and being free of oxyalkylene units,

2. is a polyalkyl ether of a polymethylol melamine,

3. is an acid catalyst and

4. is from about 0.0% to about 5.0%, by weight, based on the total weight of solids in said composition, of an ultraviolet light absorber.

4,018,942

METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTOR WITH A LAYER OF THE A-15 PHASE OF THE SYSTEM NB-AL OR NB-AL-GE

Alfred Müller, and Arno Fink, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 31, 1974, Ser. No. 519,676

Claims priority, application Germany, Nov. 2, 1973, 2355008

Int. Cl.² B05D 5/12; C21D 1/00; C22F 1/18

U.S. Cl. 427—62 28 Claims

1. A method for the manufacture of a superconductor having a layer of the A-15 phase of the system Nb—Al comprising:

a. coating a niobium carrier with a coat having a thickness between 0.5 and 5μm by placing the carrier in an aluminum melt at a temperature between 800° and 1400° C, said aluminum melt containing sufficient niobium to saturate the aluminum melt therewith; and

b. then immediately annealing the coated niobium carrier in an inert atmosphere for 0.5 to 5 seconds at a temperature of 1700°–1960° C to thereby form a layer of $Nb—Al_3$.

4,018,943

METHOD OF FORMING A CONDUCTING MATERIAL FOR A CONDUCTING DEVICE

Karl J. Youtsey, Chicago; William C. Holt, Jr., Arlington Heights; Robert D. Carnahan, Barrington, and David H. Spielberg, Schaumburg, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 66,521, Aug. 24, 1970, Pat. No. 3,651,386. This application Feb. 14, 1972, Ser. No. 226,035

Int. Cl.² H01L 21/64

U.S. Cl. 427—87 12 Claims

1. A method of making a conductive composition for use in a conducting device and comprising carbonaceous pyropolymer on a refractory oxide which comprises, contacting a pyrolyzable hydrocarbon, in the vapor phase and in a nonoxidizing atmosphere, with a refractory oxide selected from the group consisting of alumina and silica-alumina and having a surface area of from about 1 to about 500 square meters per gram, at a temperature of at least 400° C and for a time sufficient to form at least a monolayer of carbonaceous pyropolymer on said refractory oxide, said temperature and time of contacting being correlated to result in said conductive composition having a conductivity of at least about 10^{-8} inverse ohm-centimeters and within the semiconducting range, and recovering the resulting conductive composition.

5. The method of claim 1 wherein said pyrolyzable hydrocarbon is an aromatic hydrocarbon.

6. The method of claim 5 wherein said aromatic hydrocarbon is selected from the group consisting of benzene, toluene, naphthalene and anthracene.

4,018,944

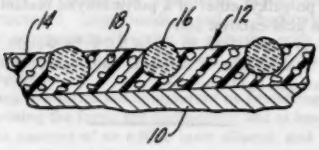
METHOD OF APPLYING A WEARING SURFACE

James R. Hallstrom, Brookfield; Raymond J. Hoffman, Fox Point, and Ronald L. Walling, Sussex, all of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Continuation of Ser. No. 414,874, Nov. 12, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 570,194

Int. Cl.² B32B *35/00*; B05D *5/00*

U.S. Cl. 427—140 7 Claims



1. A method of making a surface substantially more wear resistant where the surface is subject to wear caused by impact, abrasion, erosion or corrosion, including the steps of supplying (a) an uncured curable crosslinkable thermosetting resin and (b) a curing agent for the resin, separately, in about a 2 to 1 ratio, and a thixotropic agent in an amount sufficient to prevent settling, intermixing independently in (a) and (b) both large abrasion resistant ceramic particles and much smaller coabrasion resistant filler particles of a hardness on the order of that of the material causing wear with the smaller particles dispersed in random fashion among the larger particles, mixing all the ingredients and applying the resultant mixture to the surface subject to wear and allowing it to cure and firmly adhere to the surface.

4,018,945

METHOD OF MAKING A METALLIZED VIDEO DISC HAVING AN INSULATING LAYER THEREON

Robert Michael Mehalso, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 19, 1975, Ser. No. 588,387

Int. Cl.² B05D *3/06*; G11B *3/70*, *25/04*

U.S. Cl. 427—41 4 Claims

1. In the method of making an information record comprising a disc having a spiral groove in a surface thereof, said groove containing an information track constituted by geometric variations within said groove coated with a first layer of a conductive metal and a second layer of a dielectric material which is applied by glow discharging said metal coated disc in the presence of a polymeric precursor, the improvement which comprises glow discharging said applied dielectric layer in the presence of an oxygen-containing gas.

4,018,946

PRODUCTION OF HEAT-EXPANDABLE STYRENE-POLYMER BIT-PIECES

Max Klein, New Shrewsbury, N.J., assignor to Sealed Air Corporation, Fair Lawn, N.J.

Continuation-in-part of Ser. No. 106,915, Jan. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 889,332, Dec. 31, 1969, abandoned, which is a continuation-in-part of Ser. No. 515,445, Dec. 21, 1965, abandoned. This application Nov. 28, 1975, Ser. No. 636,103

Int. Cl.² B05D *1/18*, *7/02*

U.S. Cl. 427—222 5 Claims

1. A method of producing expandable discrete styrene-polymer bit-pieces impregnated with a liquid aliphatic impregnant, which aliphatic impregnant volatilizes below said polymer's softening point, said aliphatic impregant being selected from the group consisting of hydrocarbons, halogenated hydrocarbons and mixtures thereof, said polymer being insoluble in said aliphatic impregnant, said method comprising mixing a quantity of said styrene-polymer bit-pieces to be impregnated with a quantity of said aliphatic impregnant sufficient to provide the planned extend of impregnation in an aqueous solution, in an impregnator chamber which is free of moving parts, hermetically sealing said impregnator after filling it with said aqueous solution, rotating said sealed impregnator around an axis of rotation intersecting and perpendicular to the central axis of cylinder at a speed sufficient to maintain said polymer bit-pieces in agitation while heating the aqueous solution by indirect heat exchange to a temperature between at least about 104°F. and below the second order transition point of said polymer, until the planned extent of impregnation is reached, and separating the impregnated bit-pieces from the liquid phase.

4,018,947

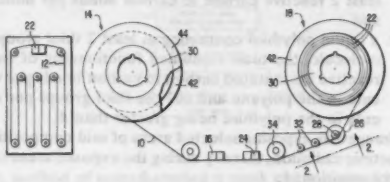
METHOD FOR EDGE MARKING RECORDABLE WEBS

Wayne B. Stone, Jr., 7307 Nevis Road, Bethesda, Md. 20034

Continuation of Ser. No. 405,904, Oct. 12, 1973, abandoned. This application Feb. 19, 1976, Ser. No. 659,565

Int. Cl.² B05D *5/00*

U.S. Cl. 427—284 14 Claims



1. A method of edge marking a recordable tape, comprising; establishing a tape path run onto a take-up reel; winding said tape on said reel to produce a plurality of wound tape wraps thereon; steps for offsetting the side edges of at least segments of radially spaced ones of said wraps relative to the remainder of said wraps during the winding thereof; and marking the offset side edges to contrast the remainder of the wound reel.

4,018,948

METHOD OF COMPOUNDING RUBBER

Jeffrey W. Saracsan, Akron, and Paul H. Sandstrom, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 4, 1975, Ser. No. 610,212

Int. Cl.² B05D *7/02*; B32B *25/08*

U.S. Cl. 427—316 2 Claims

1. A method of adhering a polyurethane to a cured rubber stock selected from the class of natural and synthetic hydrocarbon rubbers comprising compounding a hundred parts of rubber with a sulfur curative and at least one part of a polyol of less than 7000 molecular weight selected from the class of polyester polyol, polyether polyol and hydrocarbon polyol, curing the compounded rubber adhering a coating of a polyurethane to the compounded rubber by reacting free NCO of the polyurethane with the polyol to adhere the polyurethane to the cured rubber.

4,018,949

SELECTIVE TIN DEPOSITION ONTO ALUMINUM PISTON SKIRT AREAS

William A. Donakowski, and John R. Morgan, both of Dearborn Heights, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 12, 1976, Ser. No. 648,341

Int. Cl.² C23F *7/00*

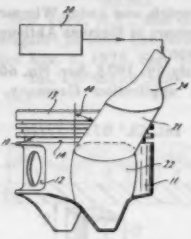
U.S. Cl. 427—327 5 Claims

1. A method of providing an element with operational protection against galling and corrosion at selected zones, comprising:

a. defining an aluminum piston for use in an internal com-

bustion engine, said piston having skirts connecting side walls of said piston and each skirt having at least one selected zone thereof to be protected, said zone extending from the upper central extremity to the lower central extremity of said skirt, said selected zone for deposition occupying less than 10% of the total exterior surface of said piston,

b. cleaning said piston zone so as to be free of dirt and organic matter as well as oxides of aluminum, and



c. directing a stream of an aqueous solution containing a protective metal agent consisting essentially of potassium stannate and characterized by its ability to plate out upon momentary contact with metal substrate, said stream being maintained at a temperature of about 140° F and being directed to contact the central upper extremity of said zone and follow the surface in said zone as a laminar flow along the remainder of the zone to the central lower extremity where flow leaves the surface.

4,018,950

DURABLE PRESS FINISHING WITH CATALYSIS BY TRIAZAPHOSPHAADAMANTANE DERIVATIVES

Robert M. Reinhardt; Donald J. Daigle, both of New Orleans, and Russell M. H. Kullman, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 614,994

Int. Cl.² B05D *3/02*

U.S. Cl. 427—381 **2 Claims**

1. In a method of preparing wrinkle resistant textile fabrics that are composed of at least 35 weight percent of a cellulosic fiber wherein said textile materials are:

a. impregnated with an aqueous solution comprised of 5 to 20% by weight of a methylol amide crosslinking agent and a catalyst; and

b. dried and cured, the improvement wherein the catalyst is contained in said aqueous solution in amounts equal to 0.2% to 6% by weight and is selected from the group consisting of salts of 1,3,5-triaza-7-phosphaadamantane and inorganic, organic, and sulfonic acids, salts of 1,3,5-triaza-7-phosphaadamantane-7-oxide and inorganic, organic, and sulfonic acids, and mixed salt complexes of 1,3,5-triaza-7-phosphaadamantane, an organic acid, and an inorganic salt.

4,018,951

ABSORBENT ARTICLES AND METHODS FOR THEIR PREPARATION

James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 468,794, May 9, 1974, Pat. No. 3,980,663, which is a continuation-in-part of Ser. No. 371,909, June 20, 1973, abandoned. This application May 9, 1975, Ser. No. 575,919

Int. Cl.² B05D *3/00, 3/02;* **C08L** *31/02, 33/02*

U.S. Cl. 427—401 **5 Claims**

1. A method of preparing a substantially dry, water swellable polyelectrolyte film which comprises the steps of

A. applying a coating on an impervious substrate wherein the coating comprises

1. a solution of a carboxylic synthetic polyelectrolyte wherein the solution consists of water, lower alcohols, or mixtures thereof and about 5 to about 60% by weight of a carboxylic polyelectrolyte, and

2. at least about 0.1% by weight based on the polyelectrolyte of a crosslinking agent reactive with carboxylate groups

B. heating said coated substrate to a temperature greater than about 30° C. to crosslink said polyelectrolyte to form a film, and

C. separating said crosslinked polyelectrolyte film from said substrate.

4,018,952

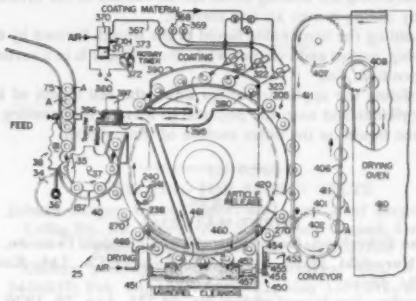
SPRAY-COATING METHOD

Roger S. Brigham, deceased, late of Crete, Ill., and by Loraine M. Brigham, heir, Harwood Heights, Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Division of Ser. No. 116,673, Feb. 18, 1971, Pat. No. 3,989,001, which is a continuation of Ser. No. 603,709, Dec. 16, 1966, abandoned. This application May 24, 1976, Ser. No. 689,246

Int. Cl.² B05D *1/02*

U.S. Cl. 427—425 **1 Claim**



1. A method of spray-coating container bodies comprising the steps of conveying a plurality of conveyor bodies along a predetermined path, disposing a plurality of spray nozzles adjacent a portion of the path for directing coating material against the container bodies, rotating the container bodies during travel thereof along said path portion, providing a source of coating material, placing the spray nozzles in fluid communication with the source of coating material, and sequentially actuating the spray nozzles to direct coating material from a first spray nozzle against a first circumferential portion of a container body and the entire axial length thereof but not completely about the entire circumference thereof, and thereafter directing coating material from a second spray nozzle against a portion of the first circumferential portion and a second circumferential portion of said container body and the entire length thereof thereby circumferentially overlapping the coating materials in the absence of a complete overlapping of the entire circumference of the container body.

4,018,953

COATING METHOD

Arthur C. Martellock, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 12, 1976, Ser. No. 713,764

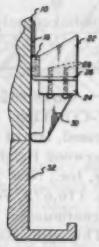
Int. Cl.² B05D *1/00;* **B05C** *3/02*

U.S. Cl. 427—430 R **7 Claims**

1. A method for applying a thin coating of a hardenable liquid material to the surface of a cylindrical substrate which comprises:

a. mounting the cylindrical substrate in vertical disposition, on a vertically elongated pedestal having the same diameter as that of the cylinders;

b. providing an applicator collar comprising a ring having an inside diameter larger than the outside diameter of the cylinder; said ring having along its inside surface a resilient ring-shaped gasket attached to the ring in such a manner that a leakproof trough is formed when the collar is slideably mounted on the cylinder by sliding it over an end thereof and providing guide fingers depending from



said ring whereby to maintain said collar in a perpendicular relationship with the cylinder axis;

c. mounting the coating collar on the outside of the cylinder by sliding it over an end thereof;

d. adding the hardenable liquid to the trough formed by the ring, gasket and cylinder while the cylinder is in a vertical position; and

e. sliding the applicator collar down the full length of the cylinder and onto the pedestal to leave a thin coating of the liquid on the outer surface of the cylinder.

4,018,954

SHEET MATERIAL

Osamu Fukushima; Kazuo Nagoshi, and Toshiaki Iwamoto, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Continuation-in-part of Ser. No. 64,721, Aug. 18, 1970, abandoned. This application Oct. 29, 1974, Ser. No. 518,829

Int. Cl.² B32B *5/24*

U.S. Cl. 428—86 **10 Claims**

1. A sheet material having leather-like grain, excellent scuffing and abrasion resistance and superior dyeability comprising in combination a fibrous substrate, an intermediate layer consisting of a finely napped porous polymeric layer bonded to said substrate and an upper layer consisting of a non-porous laminar polymeric layer completely covering and bonded to said finely napped porous polymeric layer,

said finely napped porous polymeric layer having a thickness of about 0.05 to 2.5 mm., a density of about 0.25 to 0.5 g/cc, a nap length of about 0.03 to 0.5 mm., and minute pores of about 0.1 to 100 microns in diameter, and

said non-porous polymeric layer having a thickness of 1–100 microns and consisting of a laminar structure of at least two polymeric laminae exhibiting different physical properties, of which the lamina thereof bonded to said finely napped porous polymeric layer consists of a cross-linked polyurethane elastomer.

4,018,955

PROCESS FOR PRODUCING A RING-SHAPED ONE-COLOR OR MULTI-COLOR RIBBON AND A RIBBON PRODUCED IN ACCORDANCE WITH THIS PROCESS

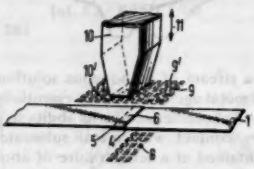
Guenter Klaüke, Munich, and Anton Wimmer, Bad Toelz, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 29, 1975, Ser. No. 600,059

Claims priority, application Germany, July 31, 1974, 2436928

Int. Cl.² B32B *31/20*

U.S. Cl. 428—57 **6 Claims**



1. In a ring-shaped ribbon made of thermoplastic material having at least one color track and formed from a strip of the ribbon of finite length, the end portions of which are overlapped and fused to form a continuous ribbon, the improvement wherein the overlapped end portions of the ribbon strip are welded in grid form to provide a series of spaced welded line joints having ink-bearing cells therebetween.

3. In the method of making a ring-shaped thermoplastic ribbon having at least one color track, by overlapping the end portions of a strip of the ribbon of finite length and fusing said end portions to form a continuous ribbon, the improvement wherein said end portions are fused by welding same under conditions of pressure and temperature in a grid form to retain ink-saturated cells within said end portions.

4,018,956

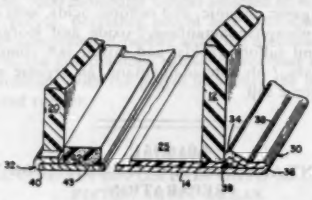
METHOD OF MAKING A DIFFERENTIALLY SHRUNK FLOCKED FABRIC, AND FLOCKED FABRIC PRODUCT

James P. Casey, Seekonk, Mass., assignor to Microfibres, Inc., Pawtucket, R.I.

Filed Oct. 3, 1975, Ser. No. 619,212

Int. Cl.² D03D *27/00*; D04H *11/00*

U.S. Cl. 428—86 **29 Claims**



29. A differentially shrunk fabric having a novel three-dimensional design, said fabric comprising a differentially shrunken substrate having adhesive and a plurality of upstanding flock fibres affixed thereto,

said substrate being composed of a design area and a background area adjacent thereto,

said background area being shrunken more tightly than said design area,

wherein said flock fibres are applied only to said design area and other flock fibres are applied to said background area,

said other fibres also being overflocked on top of said flocked fibres applied to said design area.

4,018,957
COATED FABRIC SHEET-TYPE MATERIAL HAVING RESILIENT BACKING AND PROCESS FOR MAKING SAME

Jesse Werner, New York, N.Y., and Gordon R. Rugg, Allentown, Pa., assignors to GAF Corporation, New York, N.Y.

Filed Apr. 1, 1975, Ser. No. 564,155
Int. Cl.² B32B *3/00, 3/30*
U.S. Cl. 428—141 **14 Claims**

1. A flexible, decorative sheet-type covering material comprising:

a. a decorative textured fabric base, said fabric having a height variation between about 4 and about 16 mils;

b. a transparent, flexible polyurethane or PVC wear layer at least about 4 mils thick adhered to the face of the fabric and having a surface height variation of at least about 4 mils due to the texture of the fabric; and

c. a resilient backing layer of foamed material between about 50 and about 250 mils thick and having a density between about 10 and about 40 lbs/ft³ adhered to the back of the fabric.

4,018,958
HIGH-FREQUENCY RASTER WITH IRREGULAR STRUCTURE OF RASTER ELEMENTS

Viktoria Ivanovna Andreeva, 3 Rybinskaya ulitsa, 21, korpus 2, kv. 249; Alexandra Ljudovikovna Popova, ulitsa Usievicha, 3, kv. 88, and Veniamin Semenovich Lapatukhin, Teply Stan, ulitsa Ostrovityanova, mikroraion 1a, korpus 16, kv. 16, all of Moscow, U.S.S.R.

Division of Ser. No. 451,599, March 15, 1974, Pat. No. 3,976,523. This application Dec. 24, 1975, Ser. No. 644,175
Int. Cl.² B32B *3/00;* **C03C** *15/00, 25/06*
U.S. Cl. 428—141 **1 Claim**

1. An optical high-frequency raster with an irregular structure of raster elements, the raster comprising a substantially plane-parallel glass plate mechanically ground on both sides to obtain a uniform surface structure and having transparent microroughnesses on both surfaces, the microroughnesses having a value Ra equal to 0.2 to 0.26 mμ, washed with water and subjected to multiple etching, at least three times, to obtain the transparent microroughnesses, whereby the resulting raster has a high resolving power of at least 25 mm^{-1}, and is capable of transmitting an interval of optical densities between approximately 1.0 and 1.2.

4,018,959
CORRUGATING ADHESIVE COMPOSITIONS CONTAINING THERMOPLASTIC POLYMER, THERMOSETTING RESIN, AND STARCH

Paul R. Demko, Edison; Frank J. Washabaugh, Titusville, and Robert H. Williams, Piscataway, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

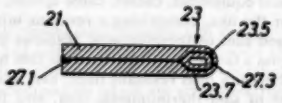
Continuation-in-part of Ser. No. 537,174, Dec. 30, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,273
Int. Cl.² B32B *3/28;* **C08L** *3/02*
U.S. Cl. 428—182 **12 Claims**

1. A corrugating adhesive composition capable of yielding dry films which are characterized by their outstanding water resistance and thermal stability; said adhesive composition comprising a mixture of (a) a crosslinkable polymer in aqueous emulsion form selected from the group consisting of vinyl acetate homopolymers, copolymers of vinyl acetate with one or more ethylenically unsaturated copolymerizable comonomers, and copolymers of C_1–C_8 alkyl esters of acrylic and methacrylic acids with one or more ethylenically unsaturated copolymerizable comonomers; (b) an ungelatinized starch which is present in amount ranging from 0.5 to 6.0 times the amount of the resinous content of said polymer, (c) a thermosetting resin selected from the group consisting of dimethylol ethylene urea, dimethylol methoxy ethyl carbamate, dimethylol isobutyl carbamate, dimethylol hydroxyethyl triazone, methylated methylol melamine, melamineformaldehyde, and urea-formaldehyde; said thermosetting resin being present in an amount ranging from about 0.1 to about 5.0% by weight, of the total composition, (d) an acidic metal salt curing agent selected from the group consisting of chromium nitrate, chromium perchlorate, zirconium nitrate, aluminum chloride, zirconium oxychloride, aluminum sulfate and aluminum nitrate; said acidic metal salt curing agent being present in an amount ranging from about 0.1 to about 2.0%, by weight, of the total composition, and (e) water; said composition having a viscosity of from about 100 to 2500 cps.

4,018,960
BELTING FOR SAFETY BELTS

Johann Berger, Gutenbergstr. 48/1, and Josef Berger, Karl-Lullig-Str. 59, both of 707 Schwabisch Gmund, Germany

Filed Sept. 24, 1975, Ser. No. 616,304
Claims priority, application Germany, Oct. 1, 1974, 2446837; Feb. 28, 1975, 2508732; May 13, 1975, 2521124
Int. Cl.² B32B *3/02*
U.S. Cl. 428—193 **15 Claims**



1. Woven belting for safety belts including:

a longitudinally extending, single layer woven belt portion of textile material having warp and weft threads and having opposite longitudinal side margins, and

at least one protective profiled element extending along one of said side margins,

said protective profiled element being in the form of a woven tube of textile material having warp and weft threads and a weave in which 3/1 alternates with 1/3,

said protective element being integral with said belt portion with said woven tube and belt portion having common weft threads,

wherein the coefficients of elongation at break of the warp threads of the said element are higher by a percentage *a* than the coefficients of elongation at break of the warp threads of the belt portion and the percentage *a* is at least substantially equal to a percentage *b* by which in a predetermined length of belting the actual lengths of the warp threads of the belt portion are greater than the actual lengths of the warp threads of the said element.

4,018,961

LAMINAR ROLLER RINK SURFACE HAVING HIGH SOLIDS CONTENT PRIMER LAYER

Barton B. Noll, Blue Springs, Mo., assignor to R. C. Sports, Inc., Olathe, Kans.

Continuation-in-part of Ser. No. 664,449, March 8, 1975, Pat. No. 3,993,823. This application Oct. 15, 1976, Ser. No. 732,886

Int. Cl.² B32B 3/28

U.S. Cl. 428—213 17 Claims

1. A laminar floor construction, comprising: a porous substrate;

a cured primer layer applied over said substrate and including the dried residue of a first synthetic resin mixture which includes an epoxy resin and a curing agent therefor and has a solids content ranging from about 85 to 100%;

a cured resiliency layer applied over and bonded to said primer layer, said resiliency layer having a thickness of from about 0.030 to 0.500 inches and comprising the dried residue of a second synthetic resin mixture which includes an epoxy resin and a curing agent therefor; and

a finishing layer applied over and bonded to said resiliency layer and including the dried residue of a third synthetic resin mixture which presents a floor surface.

9. The laminar floor construction of claim 1 wherein said primer layer is from about 0.030 to 0.500 inches in thickness.

4,018,962

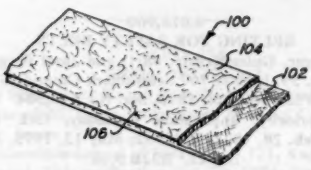
ARC AND FIREPROOFING TAPE

J. Watson Pedlow, 2500 Pine Oak Drive, Media, Pa. 19063

Filed Apr. 9, 1975, Ser. No. 566,170

Int. Cl.² C09K 3/28

U.S. Cl. 428—245 9 Claims



1. An electrical arc and fire protective tape for disposition about electrical equipment, cables, cable splices, appurtenant equipment or the like, comprising a resinous mixture coated as a heat fused film of thermoplastic resinous particles in a plasticizer upon a fabric base, said resinous film having evenly distributed therein a heat resistant fiber, heat stable over the melting point of said thermoplastic film, and fire-retardant and intumescing substances, said fiber adapted to hold the heat moltent thermoplastic from flowing, said resinous coating mixture containing no water other than chemically combined water, said fire-retardant and intumescing substances in coated position upon the fabric base protectively mounted about said electrical equipment being heat activated at high arcing and flaming temperatures to release fire protective gases to convert said protective coating into a heat insulating foam upon said electrical equipment.

4,018,963

LARGE LIGHTWEIGHT GYPSUM ARTICLE AND A PROCESS FOR THE PRODUCTION THEREOF

Masanobu Fuji, Sagamihara, and Kuniomi Suzuki, Tokyo, both of Japan, assignors to Taisei Kensetsu Kabushiki Kaisha, Japan

Filed May 20, 1975, Ser. No. 579,325

Claims priority, application Japan, May 21, 1974, 49-56134

Int. Cl.² D04H 13/00

U.S. Cl. 428—294 22 Claims

1. A large lightweight fire-resistant gypsum article which comprises anhydrous or hemihydrous gypsum, ettringite and reinforcing members, the weight ratio of said ettringite to the gypsum being 10 to 100%.

4,018,964

METHOD FOR PREPARING GLASSY FIBER HAVING PROTUBERANCES STUDDED ON THE SURFACE USEFUL FOR REINFORCEMENT AND RESULTING PRODUCT

Takashi Otouma; Susumu Aoki, both of Yokohama; Toshiaki Minaki, Yamato-kooriyama; Kenichi Shibata, Nara, and Kentaro Mori, Tokyo, all of Japan, assignors to Nippon Asbestos Company, Ltd., Tokyo, Japan

Filed July 23, 1974, Ser. No. 491,499

Claims priority, application Japan, July 27, 1973, 48-83984; July 27, 1973, 48-83985

Int. Cl.² C03B 37/04

U.S. Cl. 428—372 9 Claims

1. A method of preparing glass fiber having protuberances studded in the fiber for use as a reinforcing material, which comprises

mixing 100 parts by weight of glass fiber components with 5–25 parts by weight of a protuberance-forming substance selected from the group consisting of zirconia, zircon-sand, disapore and fused alumina,

heating the mixture in a cupola furnace at a temperature of 1320°–1450° C, and

fiberizing the resultant melt, containing both unmelted and melted portions of the protuberance-forming substance, by a spinner of blowing technique to form glass fiber having protuberances studded in the fiber in a volume of 0.1–3.0% based on the volume of the body of the fiber.

4,018,965

PHOTOCHROMIC SHEET GLASS COMPOSITIONS AND ARTICLES

David J. Kerko, and Thomas P. Seward, III, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,925

Int. Cl.² B32B 17/00; C03C 21/00, 3/26; G02C 7/02

U.S. Cl. 428—410 9 Claims

1. A chemically-strengthened photochromic drawn sheet glass article formed of a glass having a composition consisting essentially, in weight percent as calculated from the batch, of about 54–66% SiO_2, 7–15% Al_2O_3, 10–25% B_2O_3, 0.5–4.0% Li_2O, 3.5–15% Na_2O, 0–10% K_2O, 6–16% total of Li_2O + Na_2O + K_2O, 0–3.0% PbO, 0.1–1.0% Ag, 0.1–1.0% Cl, 0–3.0% Br, 0–2.5% F, 0.008–0.16% CuO, 0–1.0% total of transition metal oxide colorants, and 0–5.0% total of rare earth metal oxide colorants, said composition providing a glass having a viscosity at the liquidus temperature thereof of at least about 10^4 poises, said article having excellent chemical durability, an unabraded modulus of rupture strength of at least about 45,000 psi, and a compressively-stressed surface layer at least about 3.5 mils in thickness, and said glass being haze-free and having, in a thickness not exceeding 1.7 millimeters, a darkened luminous transmittance not exceeding about 25%, a clear luminous transmittance of at least about 60%, and a fading rate such that the glass exhibits a faded luminous transmittance at least about 1.5 times the darkened luminous transmittance after a 5-minute fading interval from the darkened state.

4,018,966
COMPOSITIONS CONTAINING A REACTIVE HYDROXYL-CONTAINING VINYL CHLORIDE POLYMER

George J. Antlfinger, Avon Lake, and Richard F. Reinhart, Elyria, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 313,603, Dec. 8, 1972, abandoned. This application May 27, 1975, Ser. No. 581,169

Int. Cl.² C08K 5/07; C08L 27/06

U.S. Cl. 428—423 17 Claims

1. A coatirg composition comprising an organic solvent having dissolved therein a hydroxyl-containing terpolymer comprised of in copolymerized form (a) from about 40% to about 90% by weight of vinyl chloride, (b) from about 10% to about 60% by weight of vinylidene chloride or vinyl acetate, and (c) from about 2% to about 20% by weight of hydroxypropyl acrylate or hydroxypropyl methacrylate, and a reactive thermosetting resin selected from the group consisting of urea-formaldehyde resins, melamine resins, and isocyanate resins.

4,018,967
MAGNETIC RECORDING TAPE

Hermann Roller, Ludwigshafen; Werner Senkpiel, Lauden-bach; Gerd Wunsch, Speyer; Job-Werner Hartmann, Ludwigshafen; Friedrich Fuchs, Kirchheim; Joachim Hack, Ludwigshafen; Volker Kiener, Ludwigshafen; Herbert Motz, Ludwigshafen, and Werner Ostertag, Willstaett, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

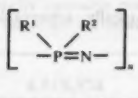
Filed Sept. 19, 1974, Ser. No. 507,466

Claims priority, application Germany, Oct. 5, 1973, 2350062

Int. Cl.² H01F 10/02

U.S. Cl. 428—425 6 Claims

1. In a magnetic recording tape of the type comprising
1. a base; and
2. a magnetic coating carried on said base, said coating consisting essentially of a dispersion of a finely divided magnetic pigment and at least one lubricant in an organic binder, the improvement which comprises: using as a lubricant in said coating at least one compound of the formula (I)



in which n is an integer of from 3 to 8, R′ and R² are identical or different and are alkoxy or aralkoxy of 3 to 18 carbon atoms, alkoxy and aralkoxy substituted with bromine or chlorine or R′ and R² conjointly are a —O—R³—O— radical in which R³ is a divalent aliphatic radical of 3 to 18 carbon atoms, wherein said compound of the Formula I constitutes from about 20 to about 100% by weight of the lubricant in the coating.

4,018,968
COATED MAGNETIC RECORDING MEDIA

Ute Neumann, Frankenthal; Hermann Roller, Ludwigshafen; Job-Werner Hartmann, Ludwigshafen; Joachim Hack, Ludwigshafen; Herbert Motz, Ludwigshafen, and Werner Ostertag, Willstaett, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

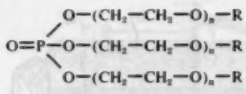
Filed Sept. 19, 1974, Ser. No. 507,457

Claims priority, application Germany, Oct. 5, 1973, 2350063

Int. Cl.² H01F 10/02

U.S. Cl. 428—539 5 Claims

1. A coated magnetic recording medium comprising a base carrying a magnetic coating which consists essentially of a dispersion of a finely divided magnetic pigment and a lubricant in an organic binder, wherein the said lubricant contains 20 to 100% by weight of a compound of the formula (1)



(I)

wherein n is an integer of from 1 to 30 and R is alkyl, alkoxyalkyl or aralkyl, each of 3 to 18 carbon atoms.

4,018,969
ELECTROCHEMICAL STORAGE CELL

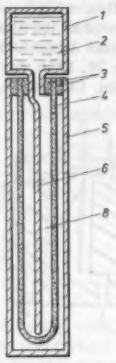
Wilfried Fischer, Neckargemund; Herbert Kleinschmager, Eppelheim; Wilhelm Haar, Sandhausen; Gert Weddigen, Hd-Neuenheim, and Franz-Josef Rohr, Absteinach, all of Germany, assignors to Brown, Boveri & Cie. A.G., Mannheim, Germany

Filed Mar. 26, 1976, Ser. No. 670,864

Claims priority, application Germany, Mar. 27, 1975, 2513651

Int. Cl.² H01M 10/00

U.S. Cl. 429—104 12 Claims



1. In an electrochemical storage cell or battery based on alkali metal and sulfur with at least one anode chamber containing alkali metal and one cathode chamber containing alkali sulfide compounds which are separated from each other by an ion-conducting solid electrolyte, the improvement comprising at least partially dissolved alkali sulfide compounds in the cathode chamber, in an organic liquid solvent with a boiling point above the operating temperature of the electrochemical storage cell, said operating temperature of the cell being in the range of about 100° to 200° C.

4,018,970
ELECTRIC CELL

Yves Jumel, and Jean-Paul Gabano, both of Poitiers, France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Oct. 10, 1975, Ser. No. 621,383

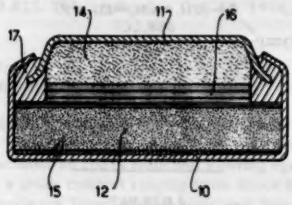
Claims priority, application France, Oct. 17, 1974, 74.34867; June 30, 1975, 75.20497

Int. Cl.² H01M 6/14

U.S. Cl. 429—162 25 Claims

1. Electric cell powering delicate equipment such as watches, said cell having a positive electrode comprising a positive active mterial and an electronic conductor in intimate mixture with it, a negative electrode and an electrolyte whose solvent is a non-aqueous liquid, characterized in that the said

electronic conductor and the reduction product of the positive active material resulting from the discharge of the cell having a decomposition overvoltage with respect to the said solvent such that the decomposition of the said solvent takes place at



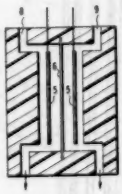
a voltage lower than the reduction voltage of the positive active material during the discharge of the cell, thereby reducing the voltage peak at the beginning of cell discharge to close the desired discharge voltage level during use of the cell.

4,018,971

GELS AS BATTERY SEPARATORS FOR SOLUBLE ELECTRODE CELLS

Dean W. Sheibley, Sandusky, and Randall F. Gahn, Columbia Station, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 20, 1976, Ser. No. 707,124
Int. Cl.² H01M 6/00
U.S. Cl. 429—105 **27 Claims**



8. An ionic transport membrane comprising a microporous substrate which contains an ion transport medium comprising a gel of hydrochloric acid and powdered silica.

18. An electrical storage device comprising an anode, an anodic fluid, a cathode, a cathodic fluid and between said anodic and cathodic fluid, an ionic transport membrane comprising a microporous substrate which contains an ion transport medium comprising a gel of hydrochloric acid and powdered silica.

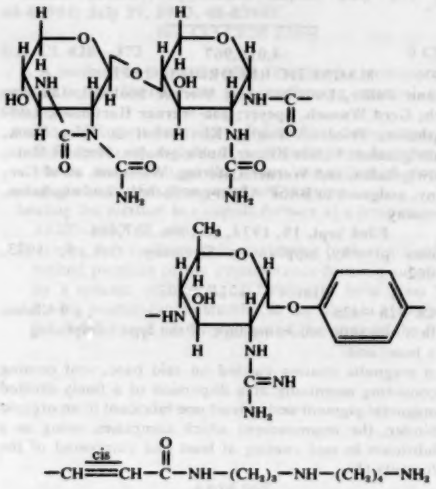
4,018,972

ANTIBACTERIAL AGENTS CIS-BM123γ_1 AND CIS-BM123γ_2

Joseph John Hlavka, Tuxedo Park, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 8, 1976, Ser. No. 664,321
Int. Cl.² C07H 15/22
U.S. Cl. 536—17 **2 Claims**

1. A compound selected from the group consisting of antibacterial cis-BM123γ_1 of the formula:



and the pharmacologically acceptable acid-addition salts thereof.

4,018,973

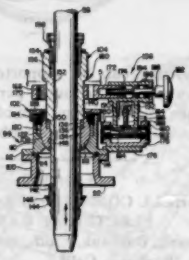
FURNACE CONSTRUCTION FOR PLASMA ARC REMELTING OF METAL

Boris Evgenievich Paton, Apt. 21, 11/13, Kotsubinskogo Str.; Victor Iosifovich Lakomsky, Bastionoja, ul. 10; Gary Alexandrovich Melnik, ul. Prazhskaya 3, kv. 169; Anatoli Ivanovich Chvertko, Blvd. Lesiga, Ukrainka 2, and Alfred Iosifovich Bukalo, Apt. 69, 8/2, Zaporozhtsa Str., all of Kiev, U.S.S.R.

Division of Ser. No. 498,937, Aug. 20, 1974, which is a division of Ser. No. 409,329, Oct. 24, 1973, Pat. No. 3,849,584. This application Feb. 20, 1976, Ser. No. 659,908

Int. Cl.² H05H *1/26*

U.S. Cl. 13—9 ES 33 Claims



1. A plasma arc remelting installation for producing ingots comprising: a hermetically sealable chamber; an ingot- forming mold contained in said chamber; a plurality of plasma arc torch means positioned above said mold; an electric power supply source, said torch means connectable so as to supply plasma to melt metal; and means enabling a metal charge to be arranged for melting in the plasma arcs and the molten metal therefrom to be solidified in said mold to form an ingot, at least one of said plasma arc torch means including a plasma arc torch, a ball and socket assembly providing a sealed mounting for enabling projection of said torch from exterior to interior of said chamber so the torch nozzle is disposed within said chamber and enabling adjustment of said torch and an adjustment control mechanism mounted on said furnace adjacent to said ball and socket assembly coacting with said torch to provide and enable infinitely variable universal inclination adjustment of said torch during remelting and including at least two independently operable control members to accomplish the variable universal inclination.

4,018,974

DIRECT CURRENT ARC FURNACE

Conny Andersson, Viken, and Sven-Einar Stenkvist, Vasteras, both of Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

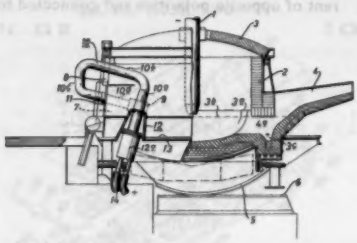
Filed Dec. 11, 1975, Ser. No. 639,916

Claims priority, application Sweden, Dec. 12, 1974, 7415575

Int. Cl.² H05B *7/00*

U.S. Cl. 13—9 R 2 Claims

1. A DC arc furnace comprising a hearth through which electric power can be transmitted to a melt when formed on the hearth, an enclosure for the hearth, at least one arcing electrode extending through said enclosure for initially melting a charge of solid metal on said hearth and thereafter heating the resulting melt, said enclosure having at least one permanent opening required for normal operation of the furnace, a starting electrode through which electric power is transmitted to a charge of solid metal on said hearth until the charge is melted down to a melt on the hearth, and means on the outside of said enclosure for mounting said starting electrode movably so it can be inserted into said enclosure through said permanent opening and into contact with a charge of solid metal on said hearth for initially melting down the charge and for thereafter removing the starting electrode from the enclosure through the permanent opening, said means being provided by a pivotal mounting offset laterally from said enclosure and said starting electrode being made with a portion



mounted by said pivotal mounting and formed so as to extend therefrom via a lever arm to a curved portion which can pass through said permanent opening by swinging via said lever arm, arcuately about said pivotal mounting.

4,018,975

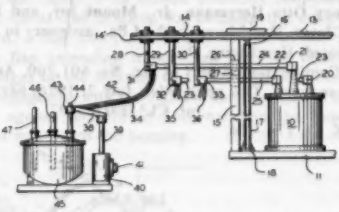
SUSPENSION MEANS FOR ELECTRIC FURNACE TRANSFORMER SECONDARY BUSES

Girish H. Kothari, Pittsburgh, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Mar. 21, 1975, Ser. No. 560,330

Int. Cl.² H05B *7/10*

U.S. Cl. 13—12 22 Claims



12. A transformer vault having walls, an electric furnace and an electric transformer, said furnace being outside of said vault and said transformer being inside of said vault, at least one of said walls having one or more openings, a plurality of bus bars extending from said transformer through selected openings outwardly of said vault, structural members generally defining said vault and:

a. cantilever beam means mounted on selected ones of said structural members and extending generally away from said vault and outside thereof at a level above said outwardly extending bus bars,

b. support means mounted on said cantilever beam means outside of said vault, and

c. means for mounting bus bars on said support means

4,018,976

KICKLESS RESISTANCE WELDING CABLE AND METHOD OF MAKING THE SAME

Earl I. Grove, 7220 Muerdale, West Bloomfield, Mich. 48033

Filed Apr. 15, 1976, Ser. No. 670,186

Int. Cl.² H01B *7/34*

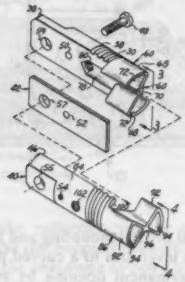
U.S. Cl. 174—19 10 Claims

1. A water-cooled resistance welding cable with an uninterrupted copper welding current path, said cable comprising

an elongated welding cable conductor assembly including a plurality of laterally-spaced flexible elongated stranded copper wire conductors of intended opposite electric polarities with an elongated separator of insulating material disposed therebetween and a flexible elongated tubular insulating casing surrounding said conductors,

a terminal connected to each of the opposite ends of said conductor assembly,

said terminal comprising a pair of copper terminal components disposed adjacent one another in laterally-spaced relationship and adapted to carry electric current of opposite polarities and connected to said con-



ductors of the same intended electric polarities, and an insulator disposed in the space between said components,

and copper-welded electrical connections disposed between the opposite end portions of said conductors and their respective terminal components.

4,018,977

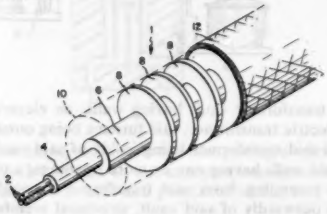
HIGH VOLTAGE CABLE WITH AIR DIELECTRIC

Henry Otto Herrmann, Jr., Mount Joy, and Douglas Wade Glover, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 601,700, Aug. 4, 1975, abandoned. This application July 2, 1976, Ser. No. 702,266

Int. Cl.² H01B 7/02

U.S. Cl. 174—24 **8 Claims**



1. A high voltage cable, comprising:

a center conductor,

a layer of solid insulation encircling said conductor,

a cover of air permeable flexible material enclosing said layer of solid insulation, said cover being impervious to dust particles and defining a dust free unpressurized air space around said solid insulation, and

spacer means between said solid insulation and said cover defining the outer radial extent of said air space.

4,018,978

ORBITAL DISC INSULATOR FOR SF_6 GAS-INSULATED BUS

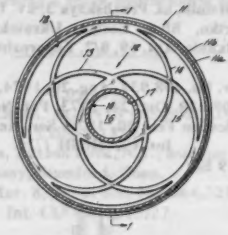
Dosio C. Bacvarov, Greensburg, and Nicholas G. Gomarac, West Newton, both of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed Feb. 25, 1976, Ser. No. 661,174

Int. Cl.² H01B 9/04, 17/58

U.S. Cl. 174—28 **24 Claims**

1. A support insulator for a high-voltage gas-insulated power transmission system having a central conductor supported within a gas-filled housing; said support insulator comprising at least first, second and third rings of insulation material which mutually intersect one another and which define a central opening bound by each of said rings and outer periphery regions; whereby the central conductor of said power



transmission system can be supported within said central opening, and whereby said outer periphery regions of said rings can engage the interior surface of said gas-filled housing to support said central conductor within said housing.

4,018,979

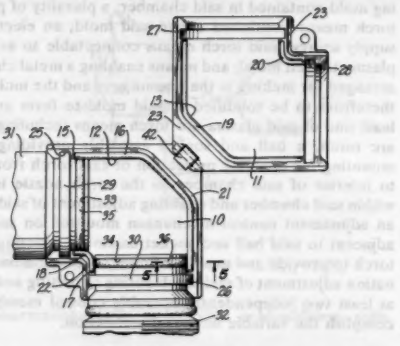
SPLIT SHELL CONNECTOR ACCESSORY FOR ELECTRICAL CABLES

Thomas F. Young, Burbank, Calif., assignor to Sunbank Electronics, Inc., Burbank, Calif.

Filed Dec. 22, 1975, Ser. No. 643,523

Int. Cl.² H05K 9/00

U.S. Cl. 174—35 C **5 Claims**



1. A split shell connector accessory for electrical cables comprising a pair of complementarily formed shell halves having a passage extending therethrough for receiving and holding a cable, one of said shell halves having an elastomeric sealing member extending continously along each side of said cable holding passage, an adapter mounted at each end of said passage, each of said adapters having an annular resilient member extending therearound, said resilient members extending in a plane transverse to the plane of said elastomeric sealing members, said shell halves having complementarily formed ridges and grooves extending continuously along each side of said passage adjacent and in the same plane as said sealing members, and said adapters and shell halves having complementarily formed annular flanges and channels extending therearound adjacent to and in the same plane as said resilient members, and means for tightening said shell halves into engagement with each other, whereby the adjacent portions of said elastomeric members and resilient members are compressed into engagement with each other and said elastomeric members are compressed into engagement with the other of said shell halves to form an environmental seal and said ridges and grooves and said flanges and channels are respectively simultaneously engaged with each other to form a RFI/EMI shield, said environmental seal and said shield ex-

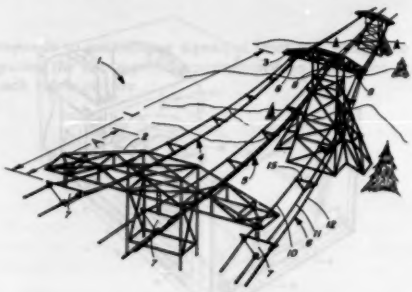
tending completely around the periphery of said passage and the cable portion disposed within said passage.

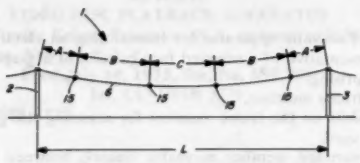
4,018,980

TRANSMISSION LINE SYSTEM HAVING IMPROVED STABILITY CHARACTERISTICS FROM WAKE-INDUCED SUBSPAN OSCILLATIONS

Mahmood Mohajery, Potsdam, and Charles B. Rawlins, Massena, both of N.Y., assignors to Aluminum Company of America, Alcoa Center, Pa.

Filed July 21, 1975, Ser. No. 597,665
Int. Cl.² H02G 7/14
U.S. Cl. 174—42 **14 Claims**





1. A transmission line system having improved stability characteristics from wake induced subspan oscillations, such system comprising,

a plurality of transmission line towers spaced apart and supporting at least one conductor bundle extending therebetween,

each of said bundles including at least two subconductors with each bundle length defining a span between adjacent pairs of said towers,

a plurality of spacer members disposed in longitudinally spaced relation along said bundle and connecting said subconductors together and defining subspans therebetween,

each span having at least two such subspans and each of said subspans having a predetermined length different from the length of an adjacent subspan, and

at least one of said spans having a structure so as to provide a plurality of longitudinally spaced nodes of the harmonics of the rigid body modes of wake induced oscillations of said span upon wind of a given velocity being applied to said span,

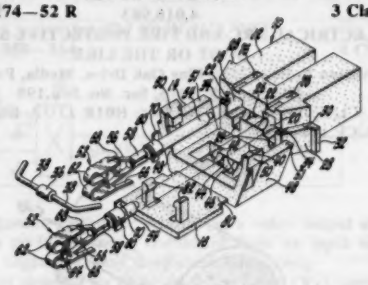
said spacer members being attached at locations along the length of an associated bundle and being disposed longitudinally away from the nodes of a selected number of the said harmonics of such rigid body modes produced from the wake-induced oscillations of the subconductors within said bundle which are present in said span in response to said given wind velocity in the attached condition of said spacer members.

4,018,981

ELECTRICAL COMPONENT PACKAGE

Harold G. Hawkins, Bristolville, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 17, 1976, Ser. No. 686,694
Int. Cl.² H05K 5/00
U.S. Cl. 174—52 R **3 Claims**



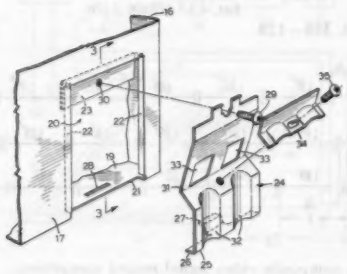
1. A once piece housing for packaging an electrical component body and connecting the component leads to terminals after packaging comprising, in combination, a housing of insulating material having a pair of open ended terminal receiving passages, a cavity intermediate the passages for receiving the body of the component, a groove in the housing outwardly of each passage for receiving a respective lead of the component when the component body is in the body receiving cavity, a cover integrally hinged to the housing and including a pair of flanges, each covering a groove and component lead therein when the cover is in closed position, cooperating means on the cover and housing for latching the cover in closed position, a flap integrally hinged to the cover, and means on the flap extending transversely into the terminal receiving passages of the housing when the flap is in closed position and engageable with terminals in the passages to lock the terminals against withdrawal and maintain the flap in closed position relative to the housing.

4,018,982

HOUSING STRUCTURE FOR ELECTRICAL APPARATUS

Imants J. Svekis, Mississauga, Canada, assignor to The Canadian Chromalox Company, Limited, Rexdale, Canada

Filed Mar. 8, 1976, Ser. No. 664,586
Claims priority, application Canada, June 24, 1975, 230022
Int. Cl.² F24H 9/02
U.S. Cl. 174—65 R **11 Claims**



1. For an electrical apparatus, a box-like housing which provides a terminal box section, the housing having a generally flat rear wall including an aperture positioned to provide manual access to the terminal box section, a removable cover plate for the aperture and means for securing the cover plate to the rear wall to cover the aperture, the cover plate including an opening to receive a pass-through cable, a clamping plate mounted on the cover plate, and means for securing the

clamping plate to the cover plate in position to clamp the cable against an outer surface of said cover plate adjacent said opening, said clamping plate also overlying and covering said opening.

4,018,983

ELECTRICAL ARC AND FIRE PROTECTIVE SHEATH, BOOT OR THE LIKE

J. Watson Pedlow, 2500 Pine Oak Drive, Media, Pa. 19063

Filed Apr. 9, 1975, Ser. No. 566,199

Int. Cl.² C09K *3/28*; **H02G** *3/04*; **H01R** *13/52*; **B65D** *25/16*

U.S. Cl. 174—135 **17 Claims**

1. A precast electrical arc and fire protective sheath, boot or the like in the form of a separately manually mountable protective unit for disposition about electrical equipment, cables, cable splices, appurtenant equipment or the like, said unit comprising a heat fused, and molded thermoplastic base having evenly distributed therein a heat resistant fiber, heat stable above the melting point of said thermoplastic base, and fire-retardant substances, said fiber adapted to hold heat molten thermoplastic from flowing, said unit being molded from a suspension containing no water other than chemically bound water, said fire-retardant substances being heat activatable at high arcing and flaming temperatures to release fire protective gases to convert said protective unit into a foamed heat insulating coating when mounted about electrical equipment, such as cables, cable splices, appurtenant equipment and the like.

4,018,984

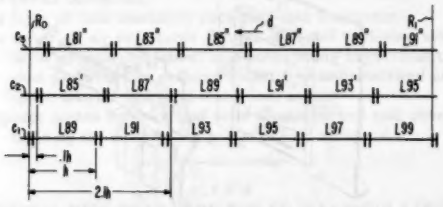
VIDEO DISC RECORD HAVING SPIRALLY ALIGNED SYNC STORAGE LOCATIONS

Eugene Orville Keizer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 12, 1974, Ser. No. 522,820

Int. Cl.² H04N *5/76*

U.S. Cl. 358—128 **6 Claims**



1. A composite video signal record comprising:

a disc having a surface bearing a spiral information track;

said information track containing recorded representations of successive frames of interlaced fields of composite video signals inclusive of horizontal sync signals recurring at a given line repetition rate, with each of said frames containing an odd integral number of line intervals;

said signal representations being distributed along the convolutions of said spiral information track in such manner that each convolution of said spiral information track contains composite video signals occupying an even integral number of frame intervals less the sum of a small integral number of line intervals and a predetermined fraction of a line interval, several times smaller than a half-line interval.

4,018,985

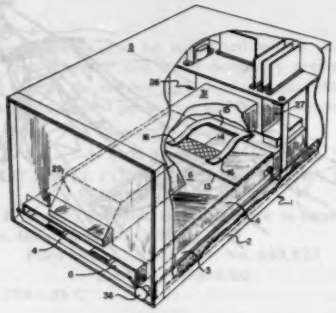
FACSIMILE APPARATUS FOR SCANNING A SELECTED PORTION OF A GRAPHIC RECORD

John M. Alden, Needham, and George C. Williams, South Easton, both of Mass., assignors to Alden Research Foundation, Westboro, Mass.

Filed Apr. 7, 1975, Ser. No. 565,865

Int. Cl.² H04N *3/02*

U.S. Cl. 358—285 **10 Claims**



1. Facsimile apparatus for transmitting an electrical signal representative of a selected face portion of a graphic record comprising:

a frame member,

means on the frame member for scanning the graphic record,

a carriage member moveable linearly between inner and outer positions on the frame member, the carriage member having framing means for locating the graphic record flatwise on a planar path passing the scanning means, the carriage member being below the scanning means and the whole framing means being exposed when the carriage is in outer position so that the graphic record is visible face up when located in the framing means by the operator, and means to limit the movement of the carriage on its path such that a selected length of the record in the direction of carriage movement is scanned.

4,018,986

CIRCUIT ARRANGEMENT FOR THE TRANSMISSION AND PRESENTATION OF AN ANALOG SIGNAL WITH A VIDEO SIGNAL

Klaus Wilk, Kersbach, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 29, 1975, Ser. No. 600,095

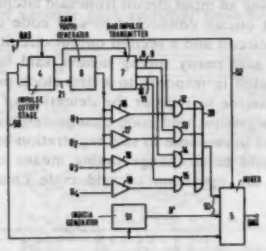
Claims priority, application Germany, July 30, 1974, 2436674

Int. Cl.² H04N *7/02*; **A61B** *5/04*; **H01R** *13/50*

U.S. Cl. 358—142 **5 Claims**

1. A circuit for the transmission and presentation of an analog signal with a video signal on the video picture screen of a television picture tube, comprising a bar impulse transmitter synchronized by synchronizing impulses from said video signal, said bar impulse transmitter generating bar impulses for producing at least one bar of constant brightness on said video picture screen; a mixer stage for receiving said bar impulses from said bar impulse transmitter, said bar impulses being superimposed on said video signal in said mixer stage; modulating circuit means being connected intermediate said bar impulse transmitter and said mixer stage for receiving said

analog signal and modulating said bar impulses dependent thereon whereby the length of the bar on said picture screen



corresponds to said analog signal; al least one integrator for integrating the bar impulse superimposed on said video signal for each video picture.

4,018,987

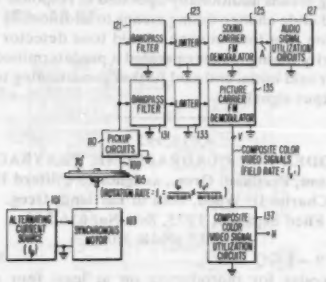
VIDEO DISC PLAYBACK APPARATUS

Eugene Orville Keizer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,758

Int. Cl.² H04N *5/76*

U.S. Cl. 358—128 **4 Claims**



1. Playback apparatus for use with a video disc record having a spiral information track containing representations of recorded composite video signals comprising successive frames of picture information and inclusive of regularly recurring deflection sync signals; said apparatus comprising the combination of:

means, subject to energization with alternating current, for causing rotation of said video disc record at a substantially constant rotation frequency bearing a subharmonic relationship to the frequency of said alternating current; and

signal recovery means, including signal pickup means normally traversing successive convolutions of said spiral information track in a regualr progression toward one extremity of said spiral track, for developing composite video signals corresponding to the composite video signal information content of said video disc record and having a frame frequency not bearing a subharmonic relationship to said alternating current frequency.

4,018,988

NEGATIVE GAMMA CIRCUIT

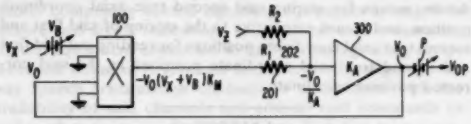
Harold George Seer, Jr., Woodbury, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 26, 1976, Ser. No. 661,616

Claims priority, application United Kingdom, Aug. 6, 1975, 32842/75

Int. Cl.² H04N *3/16, 9/53*

U.S. Cl. 358—164 **4 Claims**



1. A gamma circuit for developing a video output signal having a positive gamma coefficient from an input signal having a negative gamma coefficient, comprising:

an input terminal for receiving a first signal (V_X), having a negative gamma coefficient;

a first reference source (V_B);

first combining means coupled to said first signal and to said first reference source for providing a first additive combination ($V_X + V_B$) of said first signal and said first reference source;

a second reference source (V_X);

divider means responsive to said first additive combination signal and said second reference source for developing an output signal equal to said second reference source divided by said first additive combination signal;

a third reference source (P);

second combining means coupled to said divider output signal and said third reference source for additively combining said divider output signal and said third reference source.

4,018,989

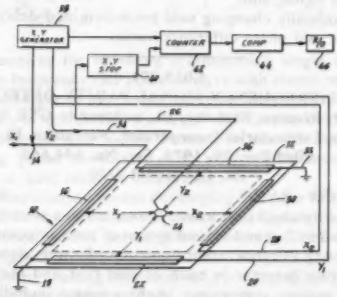
POSITION COORDINATE DETERMINATION DEVICE

Edward J. Snyder, Trumbull, and Stephen L. Domyan, Norwalk, both of Conn., assignors to Summagraphics Corporation, Fairfield, Conn.

Filed Dec. 24, 1975, Ser. No. 644,035

Int. Cl.² G08C *21/00*

U.S. Cl. 178—18 **10 Claims**



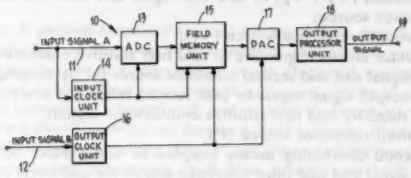
6. A self-correcting position determination device comprising a data surface and means for generating a corrected position coordinate corresponding to first and second orthogonal coordinates along respective axes for determining the location of said position, said means including first means for generating a first datum representing said position with respect to a first reference, second means for generating a second datum representing said position with respect to a second reference axially aligned with said first reference along one of said orthogonal axes, means for calculating a first true axial coordi-

nate position from a ratiometric proportionality of said first and second datum, means for storing said first true axial coordinate position, third means for generating a third datum representing said position with respect to a third reference, fourth means for generating a fourth datum representing said position with respect to a fourth reference axially aligned with said third reference along the other of said orthogonal axes, means for calculating a second true axial coordinate position from a ratiometric proportionality of said third and fourth datum, means for storing said second true axial coordinate position, and means responsive to the storing of said first and second true axial coordinate positions for reading out said first and second true axial coordinate positions as the said corrected position coordinate.

4,018,990
DIGITAL VIDEO SYNCHRONIZER

Ronald D. Long, San Jose; Allan L. Swain, Palo Alto, and Thomas C. Lyon, San Jose, all of Calif., assignors to Consolidated Video Systems, Inc., Sunnyvale, Calif.

Filed Feb. 13, 1975, Ser. No. 549,571
Int. Cl.² H04L *7/00*
U.S. Cl. 358—149 **18 Claims**



1. The method for synchronizing first and second input video type signals each of which comprises horizontal sync portions, said method comprising:

a. successively sampling said first video input signal at a first clock rate derived from said first video input signal;

b. storing the signals sampled in step (a) in a memory;

c. delaying said signals in said memory for a predetermined delay interval determined by the difference in phase between predetermined portions of said first video input signal and said second video input signal;

d. reading the signals stored in said memory at a second clock rate synchronously related to said second video input signal; and

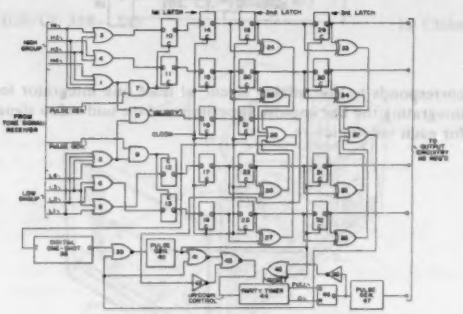
e. periodically changing said predetermined delay interval when said phase difference varies.

4,018,991
MULTIFREQUENCY SIGNAL PARITY DETECTOR

Robert H. Beeman, Berkeley, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 29, 1975, Ser. No. 644,668
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **10 Claims**

1. A parity checking circuit, connected to a source of clock pulses, and to first and second groups of tone detector circuits, for detecting the concurrent detection of a tone signal by one of said tone detector in each of said first and second tone detector groups, comprising: latching means including a plurality of first circuit inputs connected to said tone detector first group and a plurality of second circuit inputs connected to said tone detector second group and an enablement circuit input connected to said clock pulse source; parity timing means including a plurality of input circuits and an output operable to generate an output signal in response to detection of a tone by one of said tone detectors in said first group coincidental with detection of a tone by one of said tone detectors in said second group, said parity timing means output signal generated a predetermined time after said tone detections; code change timing means including an input circuit, and an output circuit connected to said parity timing means and to said latching means; and code change detection means including an input circuit from said latching means and a first output circuit connected to said code change timing means input circuit and a second output circuit connected to the input of said parity timing means; said latching means initially operated in response to a first clock pulse from said clock pulse source to register the detection of tones by said tone detector groups; said code change detection means initially operated in response to said registration by said latching means and said code change timing means conditioned in response to the operation of said code change detection



means; said latching means further operated in response to a second clock pulse from said source to further register said detection of a tone by each of said first and second tone detector groups; said code change detection means further operated in response to said further registration; said parity timing means conditioned in response to said code change detection means further operation; said code change timing means operated a predetermined period of time after said conditioning to further condition said parity timing means; said latching means additionally operated in response to operation of said code change timing means to additionally register said detection of a tone in each of said tone detector groups; and said parity timing means operated a predetermined period of time after said initial and said further conditioning to generate said output signals.

4,018,992
DECODER FOR QUADRAPHONIC PLAYBACK

Lynn T. Olson, Portland, Oreg., assignor to Clifford H. Moulton and Charles D. Wood, both of Portland, Oreg.

Filed Sept. 25, 1975, Ser. No. 616,555
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GQ **8 Claims**

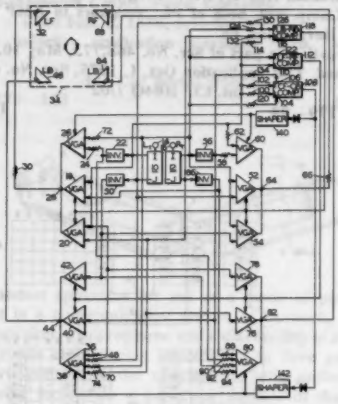
1. A decoder for reproducing on at least four separate loudspeakers adapted to be disposed at left front, right front, left back and right back positions relative to a listener at least four separate audio intelligence signals encoded into a pair of input channel signals having preselected amplitude and phase relationships, the decoder comprising:

a. a pair of independently controlled variable gain amplifier units for each loudspeaker for providing two independently variable decoding coefficients per loudspeaker,

b. phase shifting means for each of the pair of input channel signals each having an input adapted for connection to the corresponding channel and each having a plurality of outputs providing output signals of different phases which are connected to inputs of the variable gain amplifier units, and

c. three independent signal comparing means one of which is responsive to the ratio between left front and right front signals, the second of which is responsive to the ratio between left back and right back signals, and the third of which is responsive to the ratio between center front and center back signals, the comparing means having inputs

connected to selected derived outputs of the phase shifting means and having control signal outputs connected to the pairs of variable gain amplifier units for selectively



controlling operation of each unit, whereby to achieve full separation at any point on a 360° circle about a listener by varying two decoding coefficients simultaneously for each loudspeaker.

4,018,993

TELEPHONE SYSTEM COMPRISING A SATELLITE

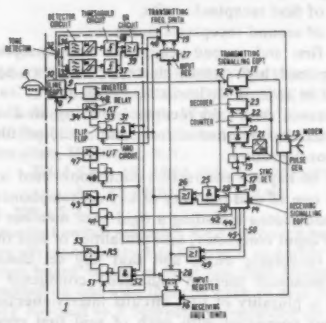
Nils Herbert Edström, Bromma, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Apr. 3, 1975, Ser. No. 564,649

Claims priority, application Sweden, Apr. 19, 1974, 7405276; Apr. 19, 1974, 7405277; Apr. 19, 1974, 7405280

Int. Cl.² H04B 7/19

U.S. Cl. 179—15 BY **3 Claims**



1. Telephone system comprising: a satellite arranged to relay a plurality of one-way signalling channels and one-way speech transmission channels, the latter being paired into two-way speed transmission channels assignable as calling and calling subscriber's channels; a plurality of earth stations comprising a plurality of line units each of which having a subscriber terminal connected to a subscriber, an input for receiving incoming speech signals, a first output for transmitting signals indicating the on-hook/off-hook condition of the subscriber and a second output for transmitting outgoing speech signals and call signalling data from the subscriber, signalling equipment connected to said first output of said line units for receiving signals indicating the on-hook/off-hook conditions of the subscribers, and including means for transmitting over said signalling channels signal indications about said conditions, and means for receiving over said signalling channels commands about assigned two-way speech transmission channels for calling and called subscribers, and a frequency synthesizer means connected to said input and second output of said line unit and to said signalling equipment for connecting the calling and called subscribers to assigned two-way speech transmission channels under control of said commands in response to signal indications and commands received from said signalling equipment; and a central control station comprising central signalling equipment arranged to receive said signal indications and transmit said commands, control equipment connected to said central signalling equipment and arranged to generate said commands assigning two-way speech transmission channels in accordance with the availability of said channels and address said commands to said earth stations, a call signalling data decoding means connected to a data input of said control equipment, and a central frequency synthesizer means connected to said control equipment for connecting said call signalling data decoding means to the speech transmission channels in accordance with the commands being generated by said control equipment.

4,018,994

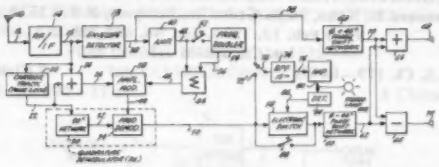
COMPATIBLE AM STEREOPHONIC RECEIVERS

Leonard R. Kahn, 70 N. Grove St., Freeport, N.Y. 11520

Continuation-in-part of Ser. No. 487,155, July 10, 1974, Pat. No. 3,908,090, and a continuation-in-part of Ser. No. 487,154, July 10, 1974, Pat. No. 3,944,749, each is a continuation-in-part of Ser. No. 251,947, May 10, 1972, abandoned. This application May 2, 1975, Ser. No. 573,905

Int. Cl.² H04H 5/00

U.S. Cl. 179—15 BT **54 Claims**



1. A receiver for receiving a compatible single sideband type radio frequency (RF) carrier wave with stereo related (L and R) intelligence appearing as upper and lower sideband modulation of the carrier wave, the said carrier being amplitude modulated with stereo summation (L+R) intelligence and being phase modulated with stereo difference (L−R) intelligence, said receiver comprising:

a. superheterodyne means developing from the received RF signal an intermediate frequency (IF) signal;

b. detection means deriving the fundamental of the L+R intelligence from a portion of the IF signal;

c. means for exalting the carrier of a portion of the IF signal;

d. means inversely amplitude modulating a portion of the exalted carrier IF signal with at least the fundamental of the L+R intelligence;

e. demodulator means deriving from the exalted carrier IF signal and the additionally amplitude modulated IF signal an audio output essentially comprising the fundamental of the L−R intelligence;

f. separate phase shift means essentially placing the fundamental L+R and L−R signals in phase;

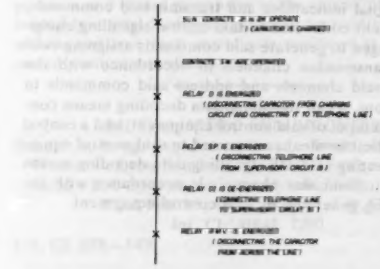
g. combining means for the L+R and L−R signals and deriving L and R stereo signals therefrom; and

h. respective acoustic output means for the L and R signals.

4,018,995
NOISE SUPPRESSION CIRCUIT FOR SWITCHED TELEPHONE LINES

Harold Grant McClelland, Manotick, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Jan. 29, 1976, Ser. No. 653,294
Int. Cl.² H04B 3/02
U.S. Cl. 179—79 12 Claims

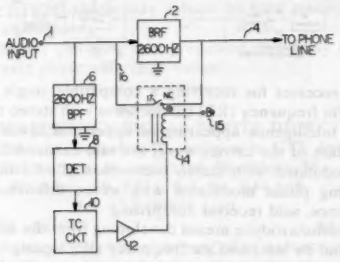


1. In a telephone system comprising a first supervisory circuit and a subscriber telephone line connected thereto, a second supervisory circuit, and means for transferring said telephone line from said first circuit to said second circuit, circuit means for suppressing noise pulses generated upon said transfer comprising, a capacitor, and switch means for connecting the capacitor across said telephone line before it is disconnected from said first circuit, said switch means including means for disconnecting said capacitor from said line a predetermined interval of time subsequent to the transfer.

4,018,996
COMMUNICATION NETWORK PROTECTION SYSTEM

Leonard R. Kahn, 70 N. Grove St., Freeport, N.Y. 11520

Filed Feb. 13, 1976, Ser. No. 657,718
Int. Cl.² H04M 1/50
U.S. Cl. 179—84 VF 7 Claims

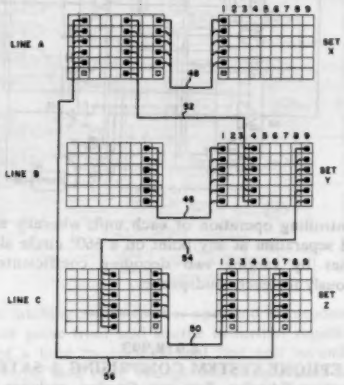


1. A method of protecting a communications channel equipped with in-band signaling from false operation by main signal components which imitate signaling tones comprising:
   a. sensing the presence of said components in the main signal which imitate the in-band signaling tone,
   b. determining whether the sensed tone components are present for a period of time exceeding a predetermined value which may falsely operate the in-band signaling equipment, and
   c. switching into the communication channel means for attenuating the signal components which imitate the in-band signaling tone when it is determined in Step (b) that the sensed tone components are present for a period exceeding the predetermined value.

4,018,997
PLUGGABLE KEY SET TELEPHONE CROSS CONNECT DEVICE

Charles Donald Hoover, Harrisburg, and Jared Nathan Worman, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 468,773, May 10, 1974, abandoned. This application Oct. 1, 1975, Ser. No. 618,666
Int. Cl.² H04Q 1/02
U.S. Cl. 179—98 12 Claims



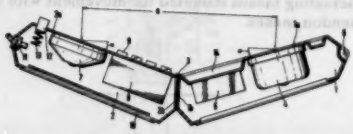
1. A telephone substation cross connect device for selectively cross connecting a plurality of incoming telephone lines with a plurality of key set telephones, said device comprising:
   a line input connector connected with said plurality of incoming telephone lines;
   a plurality of first receptacle units;
   a plurality of second receptacle units;
   each said first and second receptacle unit comprising a closely spaced, high density cluster of female receptacles arranged in at least six horizontal rows and at least five vertical rows, each said receptacle having an electrical contact fixedly mounted therein and a key profiled entrance configuration,
   a plurality of key set connectors each connected to a respective one of said plurality of key set telephones;
   circuit board means including a rigid base member having said line input connector, said pluralities of said first and second receptacle units, and said key set connectors fixedly mounted thereon and fixed conductor means forming a plurality of first circuits interconnecting said line input connector with each of said first receptacle units and a plurality of second circuits each interconnecting one of said second receptacle units with a respective one of said key set connectors; and
   a plurality of jumper cables each having both ends terminated by identical key profiled plugs, said jumper cables having one plug engaged in one of said first receptacle units and the other plug engaged in one of said second receptacle units to selectively connect each said key set to at least one incoming telephone line,
   at least some of said jumper cables having six conductors and terminated by six cavity plugs, and
   at least some of said jumper cables having five conductors and terminated by six cavity plugs, one cavity being vacant, thereby assuring proper connection of the conductors with contacts in said receptacles.

4,018,998

COMMUNICATION HAND-SET FOLDABLE FOR PROTECTION

Siegfried Wegner, Peine-Vohrum, Germany, assignor to Elmeg Elektro-Mechanik GmbH, Peine, Germany

Filed Feb. 3, 1976, Ser. No. 654,849
Claims priority, application Germany, Feb. 3, 1975, 2504314
Int. Cl.² H04M 1/03
U.S. Cl. 179—103 5 Claims



1. A handset apparatus for use as a piece of peripheral equipment in a communication system or network, and including a speaker, a microphone and a dial facility in a casing, comprising, the casing being constructed to have an upper casing part, containing the microphone with audio-access thereto being located in a particular surface of the upper casing part, and a lower casing part containing the speaker with audio-access thereto being in a particular surface of the lower casing part, one of the particular surfaces containing also the dial facilities, all of the particular surfaces containing all other manual access facilities, the lower part being hinged to the upper casing part for a first superimposing position, in which the particular surfaces of the casing parts mutually cover each other so that the manual operation facilities and audio-access to the microphone and the speaker are covered accordingly, and for a second folded up position in which the parts have a particular angle for uncovering the said audio-access as well as for access to the dial facility.

4,018,999

KEYBOARD SWITCH ASSEMBLY HAVING ADHESIVE POSITION RETAINER ELEMENT

Max S. Robinson, Richland, Wash., and Thomas J. Studebaker, Boulder, Colo., assignors to Mohawk Data Sciences Corporation, Herkimer, N.Y.

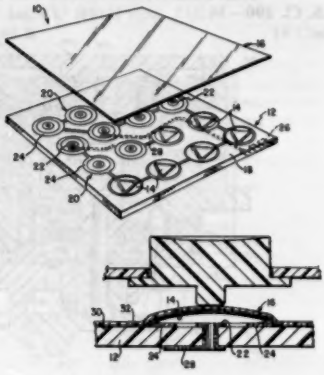
Filed Sept. 12, 1974, Ser. No. 505,389
Int. Cl.² H01H 1/34, 13/06
U.S. Cl. 200—5 A 8 Claims

1. A contact switch assembly for a keyboard having at least one normally open contact switch, said assembly comprising:

a circuit board having at least one first electrical contact provided on one side thereof, each of said first contacts being coupled to a respective conductor on said circuit board and at least one second electrical contact provided on said one side of said circuit board, each of said second contacts being proximate to a first contact and coupled to a respective conductor on said circuit board;

at least one curved resilient plate formed of electrically conductive material, each of said plates having a periphery at least a portion of which is in continuous electrical communication with a respective one of said second contacts and each plate normally spaced from and overlying a proximate first contact, each said plate being deflectable from said normally open position to a closed position wherein said plate electrically communicates with said proximate first contact; and

a retaining element covering said one side of said circuit board, said first and second electrical contacts and said curved resilient plates, said retaining element being bonded to said resilient plates and to said one circuit board side thereby maintaining said resilient plates in



position continuously communicating with said second contacts and overlying said first contacts.

4,019,000

ELECTRICAL SWITCH WITH CHEMICALLY MILLED CONTACTS

James H. Robinson, Elkhart, Ind., assignor to CTS Corporation, Elkhart, Ind.

Filed Dec. 16, 1974, Ser. No. 532,744
Int. Cl.² H01H 19/58, 1/42
U.S. Cl. 200—11 D 5 Claims

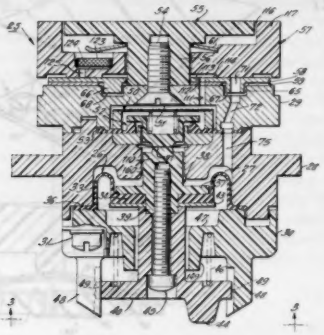
1. An electrical switch comprising a stator body of dielectric material, a movable contactor body being movable with predetermined relative motion with respect to the stator body, a plurality of electrical contacts each being fixedly attached to the stator body, the stator body being molded to the electrical contacts, each of the contacts having a planar contact surface in planar alignment with the planar contact surfaces of the other of the electrical contacts, and each of the contacts having a chemically milled leading edge surface that is disposed substantially orthogonal to the direction of motion of the contactor body with respect to the planar surface and that is at an obtuse angle to the planar contact surface thereof, an electrical contactor constrained to move with the contactor body for selectively and slideably engaging the planar contact surfaces, and resilient means urging the electrical contactor into electrical conducting engagement with selective ones of the planar contact surfaces.

4,019,001

PNEUMATIC TIMER

Keith T. Krueger, Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed May 5, 1975, Ser. No. 574,597
Int. Cl.[2] H01H 7/03; F16F 15/00
U.S. Cl. 200—34 10 Claims



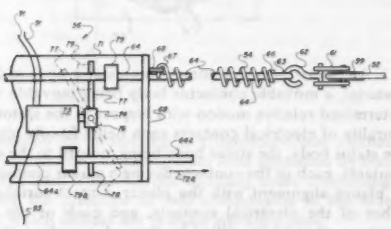
1. A timing device comprising a filter capsule subassembly including a housing means defining a cavity, check valve means disposed within said cavity, said device also comprising means defining a timing chamber, a plunger operatively connected in said chamber and mounted for movement in opposite directions in a timing and a reset stroke, a main spring urging said plunger to move in said timing stroke, means defining a reset passage, including said check valve means when open, connecting said timing chamber to ambient and proportioned to permit free movement of said plunger in said reset stroke, means defining a restricted timing passage bypassing said check valve means when closed and connecting said timing chamber to ambient thereby retarding movement of said plunger in a controlled manner during said timing stroke, said housing means including unsealed opening means communicating with said cavity, and said subassembly also including filter means covering all of said unsealed opening means.

4,019,002

POSITIVE CABLE DERAILMENT SENSING APPARATUS

Jan K. Kunczynski, Glenbrook, Nev., assignor to Lift Engineering & Mfg., Inc., Carson City, Nev.

Filed June 18, 1975, Ser. No. 588,123
Int. Cl.[2] B61B 12/00
U.S. Cl. 200—61.18 13 Claims



12. In a cable derailment sensing apparatus for use with a pair of proximate pulley means having cable sections carried thereby, said pulley means each being movably mounted to a support arm, said apparatus including a pair of tendon means each secured proximate an end thereof to said pair of pulley means for movement therewith, a pair of spring biasing means operatively connected to said pair of tendon means and formed to bias said pair of pulley means to a moved position upon derailment of said sections of cable therefrom, the improvement comprising:

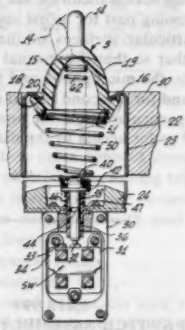
a sensing means connected to said pair of tendon means and formed to sense the movement of both of said pair of tendon means, said sensing means including a switch having at least two switch arms extending outwardly thereof, said switch arms both being connected to said switch for operation of said switch upon displacement of either of said switch arms, and said switch arms being formed and positioned for displacement of the same by actuating means mounted for movement with said pair of tendon means.

4,019,003

MULTI-DIRECTIONAL SENSOR SWITCH WITH AUXILIARY ACTUATING STRUCTURE

Arnold Duerksen, deceased, late of Salinas, Calif. (by Mildred Eva Judge Duerksen, executrix), assignor to Cochran Western Corporation, Salinas, Calif.

Filed Nov. 21, 1975, Ser. No. 634,159
Int. Cl.[2] H01H 3/16
U.S. Cl. 200—61.42 8 Claims



1. A sensor adapted for mounting at a signal station in a conveyor system for actuation by transport of an object to said station along a predetermined path of travel, comprising:

a sensor housing set into said system floor,

said housing including a top portion with a wide upwardly facing, annular opening therein defined by an inwardly extending lip,

a sensor body in the external form of an upwardly convergent figure of revolution about a normally vertical axis, said body being receivable into said housing and being configured for engagement under said lip, and for projection and convergence thereabove, and said body including a stem extending upward from its convergent upper end,

a spring abutment positioned below said sensor body and quided by means on said housing for substantially vertical travel relative to said housing,

a coil compression spring acting between said sensor body and said spring abutment to hold said sensor body normally yieldingly up against said lip,

a switch actuating element on said spring abutment,

a microswitch having an operating element engaged and deflected by said actuating element, and

said sensor body being responsive to external forces to cause lateral and downward deflection thereof to move said switch operating member so as to actuate said microswitch.

4,019,004
BUS DOOR SWITCH APPARATUS

Robert M. Gute, Corunna, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Sept. 5, 1975, Ser. No. 610,573
Int. Cl.² H01H 3/16; E05G 15/00
U.S. Cl. 200—61.43 8 Claims

1. Manually operable normally open-circuit switch apparatus comprising a touch bar and first and second spaced assemblies to which opposite end portions of the bar are attached, said bar having at least one end portion comprising an electrically non-conductive material defining the end surface of the bar; said first assembly being adapted to receive two electrical conductors and comprising:

a housing providing a recess for receiving said end portion, said recess defined by an interior circular side wall surface having a radial clearance with said end portion;

a mount plug of electrically non-conductive material supported by said housing in axially spaced relation with said end portion; said plug and said end portion having central apertures and at inoperative position being aligned generally along a switch axis coaxial or parallel with the longitudinal axis of said bar;

an elongate laterally-flexible normally-rectilinear spring extending at least partly through said apertures with its exterior surface in tightly fitting relation with surfaces defining the apertures;

an electrically conductive sleeve supported in fixed position with said housing coaxially of said switch axis at a position between, and in spaced relation with, said end portion and the end of said mount plug further away from said end portion, said sleeve having an inner surface in normally radially spaced relation with said spring, and the length of said spring between said plug and said end portion being free to warp sidewise into contact with said sleeve;

said spring and said sleeve being adapted for separate connection with two conductors of an electrical circuit;

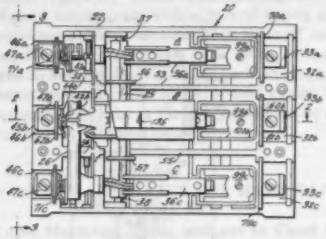
said second assembly adapted for mounting in fixed axially spaced relation with the first assembly and comprising means cooperating with means in the first assembly for maintaining said bar in a desired longitudinal or axial relation with said first assembly; and

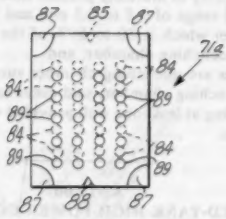
centering means urging said bar and said spring into coaxial relation with said sleeve.

4,019,005
MULTI-POLE CIRCUIT BREAKER WITH BAFFLE SHIELD VENTING

Anthony B. Michetti, Warminster, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Dec. 30, 1974, Ser. No. 537,261
Int. Cl.² H01H 9/30, 33/02
U.S. Cl. 200—144 R 10 Claims





1. A circuit breaker including a housing, separable cooperating contacts disposed within said housing, said housing having an opening for venting of expanding gases developed during interruption of arcs drawn between said contacts upon separation thereof, a baffle assembly substantially closing said opening, said assembly including first and second generally platelike elements having integrally formed protrusions which maintain perforated main portions of said elements stacked in face-to-face closely spaced relationship.

4,019,006
OVERCURRENT AND SHORT CIRCUIT PROTECTION DEVICE

Manfred Strössner, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 438,438, Jan. 31, 1974, Pat. No. 3,282,147. This application Jan. 2, 1975, Ser. No. 538,199
Claims priority, application Germany, Feb. 5, 1973, 2305533; Nov. 12, 1973, 2356410
Int. Cl.² H01H 33/08, 33/18
U.S. Cl. 200—144 R 13 Claims

1. Improved apparatus for electrical overcurrent and short circuit protection of the type in which a fusible wire is arranged in an arc-quenching chamber between first and second electrodes which, after the fusible wire is melted through, forms with the arc a current loop generating magnetic forces which act to elongate the arc, comprising:

a. a pair of horn electrodes coupled to the first and second electrodes;

b. an inner arc chamber comprising:

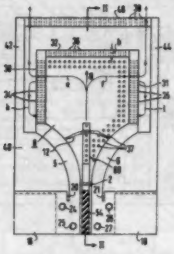
1. first and second sidewalls comprising extensions of said pair of horn electrodes;

2. an end wall abutting said first and second sidewall;

3. a bottom wall covering one side of said horn electrodes and said side walls and endwalls;

4. a top wall covering the other side of said horn electrodes, side walls and end wall;

5. said top and bottom walls being disposed parallel to each other and forming a gap which is of a sufficiently small thickness such that the voltage current characteristic of the arc has a descending portion to a minimum value with increasing current, after which it then rises for large currents and, wherein,
6. said top, bottom side walls and end walls each contain



a plurality of mutually parallel holes having a diameter in the range of 0.8 to 2.5 mm and having a total cross section which is 30 to 50% of the inside area of said arc-quenching chamber; and

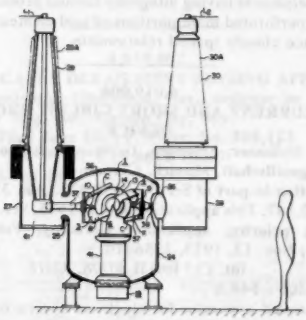
c. an outer arc-quenching chamber surrounding said inner arc-quenching chamber, said outer arc-quenching chamber having at least one wall provided with mutually parallel holes.

4,019,007

GROUNDED-TANK HIGH-POWER COMPRESSED-GAS CIRCUIT-INTERRUPTER

Robert E. Friedrich, Upper St. Clair, and Robert L. Hess, N. Versailles, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,713
Int. Cl.² H01H *33/82*
U.S. Cl. 200—148 B **9 Claims**



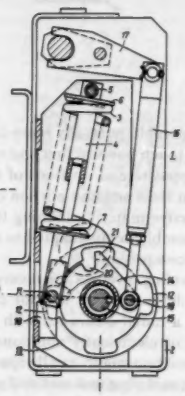
1. A high-voltage, high-power compressed-gas circuit-interrupter including a vertically-extending generally-cylindrical grounded metallic tank (24), a two-break rotatable-contact-arm type of arc-extinguishing assembly having its axis of rotation generally horizontally arranged and disposed within said vertically-extending grounded metallic tank structure, a pair of off-jutting metallic terminal-bushing housings, a pair of laterally-spaced vertically-extending terminal-bushings extending upwardly one from each of said metallic terminal-bushing housings so that the line-connections assume a generally U-shaped arrangement, an insulating stationary tubular support (41), extending downwardly from said two-break rotatable-contact-arm type of arc-extinguishing assemblage to the bottom of said cylindrical vertically-extending metallic tank structure, an operating rod extending upwardly through said tubular insulating support, a high-pressure gas-reservoir chamber disposed generally upon the axis of said arc-extinguishing assemblage, gas conduit means extending through the hollow rotatable arms of said arc-extinguishing assemblage, whereby gas may flow generally horizontally along the axis of said assemblage and radially outwardly through the two hollow rotatable arms of said rotatable assemblage, and a high-pressure gas-conduit extending up through said vertically-extending tubular stationary insulating support (41) to said high-pressure gas-reservoir chamber.

4,019,008

ACTUATING MECHANISM FOR SNAP-ACTUATING AN ELECTRIC SWITCHING APPARATUS

Werner Kohler, Bentfeld, Holstein, and Norbert Steinemer, Berlin, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 14, 1975, Ser. No. 604,834
Claims priority, application Germany, Aug. 16, 1974, 2439837
Int. Cl.² H01H *3/00*
U.S. Cl. 200—153 SC **2 Claims**

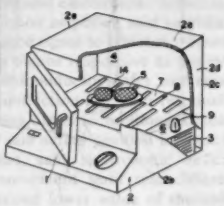


1. An actuator mechanism for snap-actuating electric switching apparaus such as vacuum switching apparatus comprising: spring means for receiving the energy needed to snap-actuate the vacuum switching apparatus, said spring means including a spring for receiving said energy and a holder assembly having two holding parts movable relative to each other for stressing said spring therebetween, one of said parts including a take-along bolt; cocking means movable for stressing said spring means for imparting thereto said energy for actuating the vacuum switching apparatus, said cocking means comprising mutually adjacent rotatable cocking parts having respective openings formed therein for engaging said take-along bolt and moving the same so as to cause said holding parts to impart said energy to said spring thereby loading said bolt with the energy of said spring; and transmission means for receiving said energy of said spring means and for transmitting the same to the vacuum switching apparatus in a movement independent of said cocking means, said transmission means including mutually adjacent rotatable transmission parts mounted concentrically with said cocking parts so as to be movable independently of the latter, said transmission parts having openings for receiving said take-along bolt therein after said spring has been stressed by said cocking means whereby said bolt applies the energy of said spring to said transmission parts.

4,019,009
MICROWAVE HEATING APPARATUS

Shigeru Kusunoki, Yamatokoriyama; Teruhisa Takano, Osaka, and Noboru Kurata, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 6, 1975, Ser. No. 547,746
Claims priority, application Japan, Feb. 8, 1974, 49-16623
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 F **12 Claims**



1. A microwave heating apparatus comprising:

a casing formed of electrically conductive metallic material and having an opening therein, a door closing said opening, said door and casing defining an enclosed chamber;

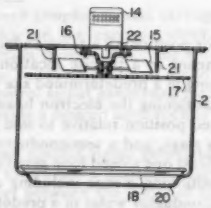
a surface wave transmission line positioned within said chamber and dividing said chamber into a heating space for receipt of an object to be heated and a transmission space, said transmission space extending continuously along the entire area of one side of said surface wave transmission line; and

a source of microwave power for generating microwaves, at least a portion of tbe energy from said microwave power source being coupled to said transmission space, said transmission space comprising means for transmitting microwaves to said surface wave transmission line over the entire area of said one side thereof, such that said surface wave transmission line forms a surface wave transmission mode which propagates within said heating space at a wave length less than the free-space operating wave length.

4,019,010
MICROWAVE OVEN WITH UNIFORM ELECTRIC FIELD DISTRIBUTION

Junzo Tanaka, Fujiidera; Haruo Matsushima, and Yukio Abe, both of Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 27, 1975, Ser. No. 562,412
Claims priority, application Japan, Apr. 17, 1974, 49-43607
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 F **6 Claims**



1. A microwave oven comprising a main oven body, a heating cavity of substantially parallelepiped structure having top and rear walls, a door releasably closing an opening of said heating cavity, and a high frequency feeder section for supplying microwave energy into said heating cavity, wherein the improvement comprises:

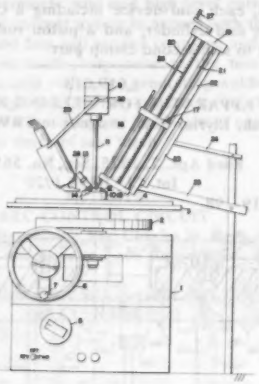
means for mounting said high frequency feeder section on the top wall of said heating cavity, said feeder section being positioned substantially symmetrically, both depthwise and lengthwise, with respect to said heating cavity for producing a main mode excitation having a plurality of strong vertical electric-field components distributed parallel to the depth of said heating cavity, and

a pair of parallel conductor plates mounted on the top wall of said heating cavity on both sides of said high frequency feeder section, said pair of conductor plates protruding substantially vertically inside said heating cavity and being aligned respectively with a pair of strong electric-field components distributed on both sides of said high frequency feeder, whereby said main mode of excitation is changed to another having strong vertical electric-field components parallel to the width of said cavity thereby providing sufficient heat at the center portion of an article placed within said heating cavity.

4,019,011
METHOD OF AND APPARATUS FOR HARD FACING POPPET VALVES

Arthur T. Cape, Monterey, Calif., assignor to Coast Metals, Inc., Little Ferry, N.J.

Filed Jan. 27, 1975, Ser. No. 544,054
Int. Cl.² B23K *9/04, 9/08*
U.S. Cl. 219—76 **12 Claims**



1. In a method of coating the working surface of a poppet valve with hard facing material, the steps of supporting the valve with its working surface facing upwardly, striking an arc between a non-consumable tungsten electrode and the end of a rod of said hard facing material, whereby to cause metal from said rod to melt and be deposited on said working surface, rotating said valve about its axis during said melting, and electromagnetically controlling the distribution of said molten metal on said working surface.

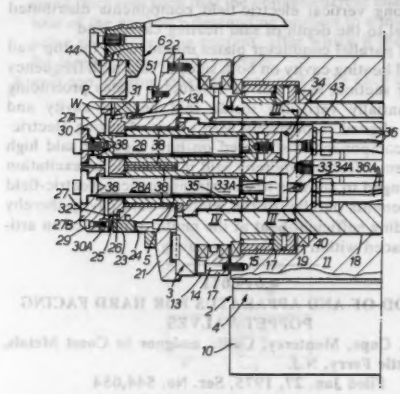
4,019,012
WELDING APPARATUS

Alois Raffauf, Koblenz-Kesselheim, and Eduard Wolfle, Mulheim-Karlich, both of Germany, assignors to Girling Limited, Birmingham, England

Filed Apr. 8, 1975, Ser. No. 566,074
Claims priority, application United Kingdom, Apr. 9, 1974, 15724/74; Nov. 22, 1974, 50675/74
Int. Cl.² B23K *11/06;* **B23Q** *3/00*
U.S. Cl. 219—79 **13 Claims**

1. A welding apparatus for welding together a platform and an arcuate web, comprising rotatable web clamping means including an axially fixed first clamp part and a second clamp part defining a recess therebetween, said second clamp part being axially movable to clamp a web in said recess between

said parts, means for passing an electrical current to said web through one of said parts, and clamp actuating means rotatable with said web clamping means for axially moving said



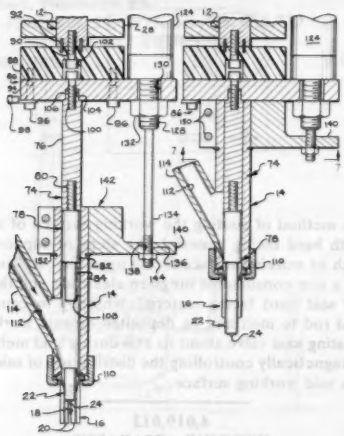
second clamp part, said actuating means being located on the same side of said recess as said first clamp part and extending there through, said actuating means comprising one or more fluid pressure operable devices rotatable with said web clamping means, each said device including a cylinder, a piston working in said cylinder, and a piston rod secured to said piston and to said second clamp part.

4,019,013

APPARATUS FOR WELDING STUDS

Steve Spisak, Elyria, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Apr. 7, 1975, Ser. No. 565,535
Int. Cl.² B23K 9/20
U.S. Cl. 219—98 19 Claims



13. Stud welding apparatus comprising a back-up plunger, means affixed to said back-up plunger for moving said back-up plunger between a retracted position spaced from a workpiece and a forward position toward the workpiece, said back-up plunger being rigidly supported by said moving means at all times during a welding cycle, means forming a loading passage into which said plunger extends, said loading passage means having means at one end thereof for holding a stud, and means for moving said loading passage means between a position in which said plunger is spaced from said stud-holding means and a position in which said plunger is near said stud-holding means to back up and rigidly support a stud held thereby.

4,019,014

METHOD FOR HEAT WELDING SELENIUM

John Frank Byrne, Worthington, Ohio, assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 23, 1975, Ser. No. 570,677
Int. Cl.² B23K 11/16
U.S. Cl. 219—118 8 Claims

1. A method for repairing damaged selenium photoconductors comprising:

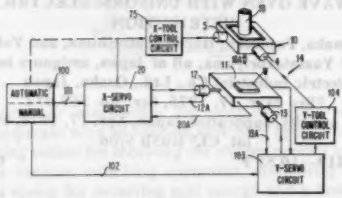
applying a concentrated source of heat to a minute region of the photoconductor including a damaged area of selenium, in an oscillating motion traverse to the damage for such period of time that a weld healing of the damaged photoconductor material occurs.

4,019,015

PRECISION TOOL AND WORKPIECE POSITIONING APPARATUS WITH RINGOUT DETECTION

Javathu K. Hassan, Hopewell Junction; Carl V. Rabstejnek, Wappingers Falls, and Anthony D. Wutka, Fishkill, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 395,502, Sept. 10, 1973, Pat. No. 3,886,421. This application Feb. 26, 1975, Ser. No. 553,385
Int. Cl.² B23K 15/00
U.S. Cl. 219—121 EB 2 Claims



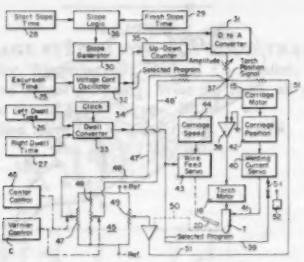
1. Apparatus for positioning a semiconductor wafer and an electron beam means in a precise location relative to each other by positioning in a predetermined site said semiconductor wafer then positioning the electron beam means in a precise predetermined position relative to said site, said apparatus comprising: a stage, and a semiconductor wafer mounted on said stage, at least one closed loop servo system connected to said stage, positioning means including a motor for positioning said semiconductor wafer in a predeterming site, position indicator means for determining the actual position of said semiconductor wafer relative to a fixed reference, and a signal output from said position indicator means indicative of said actual position of said semiconductor wafer at any one time; an error generator, and means for providing to said error generator the desired position of said semiconductor wafer relative to said reference; and means for inputting said error generator with said signal output from said position indicator means, and means in said error generator to produce a differ-

ence signal therefrom indicative of the difference between the actual position of said semiconductor wafter and the desired position of said semiconductor wafer; and means responsive to said difference signal to actuate said positioning means until said difference signal is such that said semiconductor wafer is in said predetermined site; and first means responsive to said difference signal, when said semiconductor wafer is in said predetermined site to stop said positioning means, an electron beam means including electrostatic deflection means to deflect an electron beam, and electrostatic deflection amplifier and means coupling said electrostatic deflection means to said electrostatic deflection amplifier, said amplifier being responsive to said difference signal to effect movement of said beam; ring out detection means responsive to the rate of change of position of said semiconductor wafer, and means for enabling said electrostatic deflection amplifier responsive to an output signal from said ring out detection means indicating that said rate of change of said actual position has reached a predetermined lower value, said electrostatic deflection amplifier effecting beam movement until said difference reaches a predetermined second lower value of thereby effect precise positioning of said beam relative to said semiconductor wafer.

4,019,016
WELDING CONTROL SYSTEMS

Robert Friedman, and Howard D. Lesher, both of Saugus, Calif., assignors to Dimetrics, Inc., Sepulveda, Calif.

Continuation-in-part of Ser. No. 421,397, Dec. 3, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,517
Int. Cl.² B23K 9/10
U.S. Cl. 219—125 R **5 Claims**



1. An automatic arc are welding system comprising, in combination:

a. a track positionable adjacent to a weld path on a member to be welded;

b. a carriage coupled to said track;

c. a carriage motor on the carriage for moving it along the track at a given speed so that the carriage follows along the path;

d. a welding torch coupled to said carriage;

e. a torch motor on the carriage which when energized causes excursion movement of the torch in a direction perpendicular to the direction of motion of the carriage;

f. amplitude control signal generating means for said torch motor to provide a desired amplitude of excursion of said torch;

g. excursion time control signal generating means for said torch motor to provide a desired excursion time for the torch to travel between the limits of the desired amplitude;

h. left and right dwell time control signal generating means for said torch for individually providing desired left and right dwell times of the torch at the left and right limits of the torch excursion on the left and right sides of the weld path respectively, whereby the selected amplitude, excursion time, and left and right dwell times may be automatically controlled;

i. welding current servo means for supplying welding current to said torch;

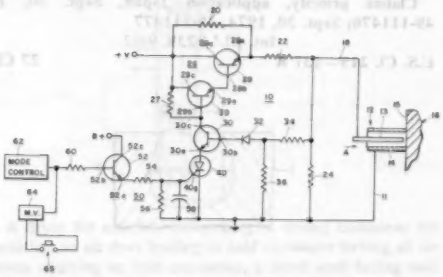
j. welding current control means connected to and controlling said welding current servo means to provide current to the torch, said welding current control means including means for providing low frequency current pulses alternating between adjustable high and low current levels, the frequency and duty cycle of the high current level being independently adjustable, said means comprising in combination a high level current source; a low level current source; a switch logic means connecting said high level current source and low level current source to said welding current servo so that when said switch logic means is switched back and forth the high level current source and low level current source are alternately applied to the welding current servo; means for generating a series of pulses at a frequency proportional to the carriage speed in inches per second divided by a given number of pulses per inch as set into said system; first and second counters connected to receive said pulses at their inputs; and a flip-flop circuit having set and reset terminals connected respectively to the outputs of said first and second counters, said first counter automatically resetting itself and providing an output pulse to said flip-flop when a given number of pulses have been counted, and said second counter providing an output after a given count is achieved less than said first mentioned count to reset said flip-flop, said duty cycle being set into said second counter, said flip-flop connecting to said switch logic means to alternately pass said high level current source and low level current source in accord with the selected counts for said first and second counters; and,

k. means automatically responsive to the torch position connected to said means for generating welding current so that the high level current occurs during the left and right dwell times and the low level current occurs during the excursion times of said torch.

4,019,017
ARC CONTROL CIRCUIT

George J. Sitek, Stevensville, and Charles W. Berk, St. Joseph, both of Mich., assignors to Leco Corporation, St. Joseph, Mich.

Filed Apr. 14, 1975, Ser. No. 567,930
Int. Cl.² H02H 9/00
U.S. Cl. 219—135 **2 Claims**



1. An electrical circuit for providing a low voltage to an electrode used for striking an arc against a conductive member and for providing a higher arc sustaining voltage to said electrode only when said electrode is in an arcing position in conductive relationship with a conductive work piece, said circuit comprising:

a pair of output conductors for supplying electrical power to an electrode and a work piece;

a source of direct voltage;

voltage dividing means including first and second serially coupled resistors wherein said first resistor has an end remote from said second resistor coupled to said source and said second resistor is coupled between said output

conductors for providing an output voltage between said conductors lower than the voltage of said source;

solid state switching means for selectively bypassing at least a portion of said voltage dividing means to increase the voltage applied to said output conductors;

detection means coupled to said output conductors and to said solid state switching means for actuating said solid state switching means to bypass said voltage dividing means when said output conductors are momentarily shorted by an electrode engaging a work piece, said solid state switching means comprising a first transistor having base, collector and emitter terminals wherein said base terminal is coupled to said detecting means and said first resistor is coupled between said collector and emitter terminals such that said first resistor is bypassed when said transistor is conductive and said detection means comprising a second transistor having base, collector and emitter terminals wherein said base terminal is coupled to one of said output conductors and one of said collector or emitter terminals is coupled to said base terminal of said first transistor, and means for coupling the remaining one of said collector or emitter terminals to the other of said output conductors such that voltage between said output conductors from said source forward biases said second transistor, and wherein said coupling means comprises an SCR having an anode-to-cathode current path coupled between said second transistor and said other output conductor and a gate terminal coupled to means for providing a control signal to trigger said SCR.

4,019,018

PROCESS FOR NARROW GAP WELDING OF ALUMINUM ALLOY THICK PLATES

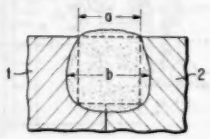
Minoru Oishi, Fujisawa; Masaharu Rokujo, Kobe; Hisaaki Yokota, Chigasaki; Naoki Okuda, Kamakura; Makoto Tomita, Yokohama, and Toshihiko Endo, Kamakura, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Jan. 29, 1975, Ser. No. 545,026

Claims priority, application Japan, Sept. 30, 1974, 49-111476; Sept. 30, 1974, 49-111477

Int. Cl.² B23K *9/02*

U.S. Cl. 219—137 R **27 Claims**



1. A process for the narrow gap welding of aluminum and aluminum alloy plates greater than 20 mm in thickness with a non-consumable electrode, which comprises the steps of:

first inserting the filling material into the welding groove, and then applying a direct current of more than 300 A between said non-consumable electrode which is characterized by a flat welding end configuration and a current density of 10–50 A/mm² and said plates to be welded with straight polarity,

maintaining arc length from 0.5 to 5 mm during said welding; and

shielding the welding groove with an inert gas comprising at least 50% helium.

4,019,019

METHOD OF PRODUCING TUBE RODS AND ARTICLES PRODUCED THEREFROM

James Arlen Cole, El Monte, Calif., assignor to Cabot Corporation, Kokomo, Ind.

Filed Mar. 20, 1975, Ser. No. 560,305

Int. Cl.² B23K *35/36*

U.S. Cl. 219—146 **8 Claims**

1. The method of closing the ends of hollow weld rods filled with particulate solids comprising the steps of mechanically reducing the diameter of the hollow rod ends to restrain the solids from falling out the end while leaving an opening into the interior, dipping one end in a fluid material having sufficient capillarity to enter between the particles of filler within the hollow tube adjacent each end and solidify to form a film over the tube end and within the particulate solids filler adjacent the end, permitting said fluid material to become sufficiently viscous to retain its position within the particulate solids prior to dipping the other end, dipping the other end of said weld rod in said fluid material and solidifying the fluid material in both ends.

4,019,020

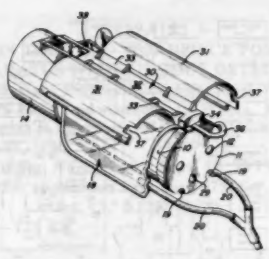
CONTROLLED TEMPERATURE FLUID HEATER

Larry T. Bilbee, and Thomas L. Clabaugh, both of Bellville, Ohio, assignors to The Gorman-Rupp Company, Mansfield, Ohio

Filed Aug. 13, 1975, Ser. No. 604,339

Int. Cl.² A61M *5/14;* **F24H** *1/12;* **B67D** *5/62;* **F28F** *7/00*

U.S. Cl. 219—302 **4 Claims**



1. Apparatus for maintaining a flow of fluid at optimum temperature comprising an inner mandrel having high thermal conductivity, means for maintaining said inner mandrel at constant optimum temperature, a substantially flat plastic bag wrapped around said inner mandrel and having sealed linear areas forming a labyrinth of passageways through the bag, said sealed linear areas being interrupted by gaps adapted to inhibit the accumulation of air bubbles along the sealed linear areas, and an outer housing havng hinged wings for holding said bag in wrapped-around contact with said inner mandrel when their free edges are secured in abutment with each other.

4,019,021

ELECTRIC RESISTANCE FLUID HEATING APPARATUS

Hermann J. Schladitz, Munich, Germany, assignor to Schladitz-Whiskers, A.G., Zug, Switzerland

Division of Ser. No. 23,090, April 6, 1970, Pat. No. 3,833,791, which is a continuation of Ser. No. 474,797, July 26, 1965, abandoned. This application June 6, 1974, Ser. No. 476,946

Claims priority, application Switzerland, July 28, 1964, 9872/64

Int. Cl.² H05B *3/12;* **F24H** *1/10, 3/04*

U.S. Cl. 219—381 **15 Claims**

1. A resistance heater for rapidly heating a fluid to a desired temperature, comprising an electric resistance element including a porous mat of fine, electrically-conductive, elon-

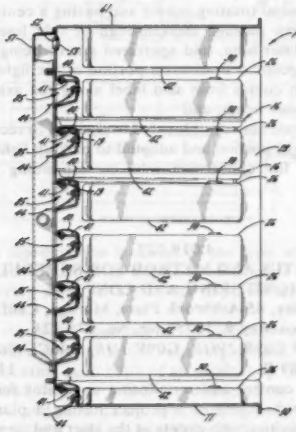
gated elements connected together so as to be electrically conductive, said elongated elements being selected from the group consisting of metalcoated non-metal whiskers and polycrystalline metal whiskers, power means for supplying electric energy to said resistance element, and a non-conductive tubular structure accommodating the resistance element therein so that substantially all of the fluid flows through said porous

mat, said porous mat being disposed so as to substantially fill a portion of the length of said tubular structure, said tubular structure having at one end an opening for admission of the fluid to be heated and at the opposite end an opening for discharge of the heated fluid, wherein said elongated elements are connected at the contact points thereof by metalization from the gaseous phase.

4,019,022
STORAGE SYSTEM FOR HOT FOOD TRAYS

Gene J. Seider, Bloomington; Michael C. Freund, Mendota Heights, and James R. Duffy, West St. Paul, all of Minn., assignors to Gould Inc., Chicago, Ill.

Filed Apr. 30, 1975, Ser. No. 573,078
Int. Cl.² F27D 11/02
U.S. Cl. 219—386 3 Claims



1. A storage system for hot food trays containing electrical heaters connected to electrical contacts on the rear portions of the trays, said system comprising the combination of

a. a storage compartment having a plurality of vertically spaced tray support means including vertical shoulders adapted to cooperate with complementary shoulders on the front portion of the trays to latch the trays in the storage compartment when the trays are fully inserted therein,

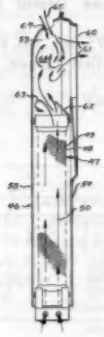
b. a plurality of spring contacts within the storage compartment for providing electrical connections with the contacts on the trays while urging the rear portions of the trays carrying the contacts away from said support means,

c. and guide means for the trays forming a fulcrum located forwardly of said spring contacts toward said latching shoulders rearwardly of said latching shoulders, on the opposite side of the tray from the spring contacts, so that said spring contacts urge the rear portions of the trays upwardly about said fulcrum thereby urging said complementary shoulders on the front portions of the trays downwardly against said latching shoulders on the tray support means.

4,019,023
ELECTRICALLY HEATED DRYER

James M. Marzonie, Hancock, and Karl Jautakis, Sawyer, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed June 16, 1975, Ser. No. 587,437
Int. Cl.² F26B 11/00; H05B 3/12; F24H 3/04
U.S. Cl. 219—400 11 Claims



1. A dryer for articles, comprising: a drying container for the articles; an air duct leading to said container having an air entrance opening to said container, a front wall facing said container and a rear wall; means for directing an air stream through said duct; heating means in said duct spaced from said entrance for heating said air stream; an air mixing baffle means in said duct upstream of said air entrance opening and downstream of said heating means and adjacent said front wall and extending at an angle in the direction of said air stream and inwardly of said duct and toward said rear wall and said entrance for creating an even temperature turbulence in said air stream thereby tending to eliminate any hot air stratification; an ambient air inlet opening means to said duct between said baffle and said air entrance opening and downstream of said heating means, and said baffle means said baffle means being located downstream of said heating means and upstream of said ambient air inlet.

4,019,024
ROLLER FOR FIXING ELECTROPHOTOGRAPHIC TONER IMAGES AND METHOD OF PRODUCING THE SAME

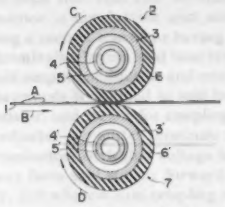
Ryoichi Namiki, Hino, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 440,341, Feb. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 339,979, March 12, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,289

Claims priority, application Japan, Mar. 29, 1972, 47-31411

Int. Cl.² B21B *27/06*; H05B *3/02*

U.S. Cl. 219—469 **7 Claims**



1. An image fixing roller for electrophotography comprising a core, a roll layer disposed around the core and made of silicon rubber whose outer surface is ground, said roll layer being impregnated with silicon oil and being adapted to be heated for melting toner particles forming toner images, and the outer peripheral surface of the roll layer tending to wear off when exposed to heat and friction.

4,019,025
CARD CONVEYOR DEVICE

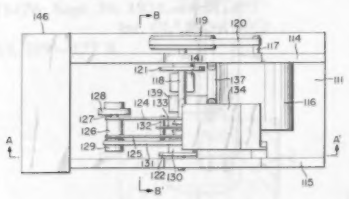
Tadasu Taniguchi, Tokyo; Iwao Hosaka, and Shigehiro Kato, both of Chichibu, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Saitama, both of, Japan

Filed Sept. 5, 1975, Ser. No. 610,875

Claims priority, application Japan, Sept. 9, 1974, 49-103701

Int. Cl.² G06K *13/02*, *7/10*

U.S. Cl. 235—61.11 R **55 Claims**



1. A card conveyor device comprising:

a card guide path along which a card for reading or writing information therein is guided in a predetermined direction;

an inlet-outlet port for inserting therethrough said card into said card guide path and for discharging therethrough said card from said card guide path;

first and second card transport means disposed successively along said card guide path in the direction from said inlet-outlet port;

first detector means for detecting that said card has been inserted into said card guide path through said inlet-outlet port and that said card has been discharged from said card guide path;

second detector means for detecting that said card, after its forward movement from said inlet-outlet port toward said card guide path, has reached a predetermined position on said card guide path;

third detector means for detecting the position of said card on said card guide path between said first and said second detector means;

control means for bringing said first card transport means into or out of engagement with said card in accordance with an output from said third detector means; and

drive means for driving said first and second card transport means forwarly in response to a signal from said first detector means and for reversing the forward drive of said first and second card transport means in response to a signal from said second detector means.

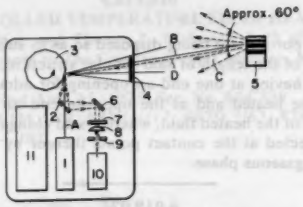
4,019,026
LASER BEAM LABEL READER HEAD

Sadao Nakanishi, and Nobufumi Tokura, both of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan

Filed Sept. 23, 1975, Ser. No. 616,057

Int. Cl.² G06K *7/14*; G02B *5/08*; G06K *9/10*

U.S. Cl. 235—61.11 E **2 Claims**



1. A laser beam label reader head for reading code information on a label by irradiation of a laser beam, comprising in combination:

a laser tube for radiation of a laser beam;

a polyhedral rotating mirror located in position to reflect the laser beam from said laser tube toward a label to scan code information on the label;

an apertured mirror positioned between said laser tube and said polyhedral rotating mirror and having a center aperture to allow passage therethrough of said laser beam from said laser tube, said apertured mirror being held in a slanting position to divert a portion of the light reflections which comes from said label along the axis of the scanning laser beam; and

an photoelectric converter located in position to receive the diverted light portion and adapted to pick up light signals therefrom for conversion into corresponding electric signals.

4,019,027
APPARATUS AND METHOD FOR SCHEDULE MONITORING AND CONTROL

William L. Kelley, 45 Ashbrook Place, Moraga, Calif. 94556

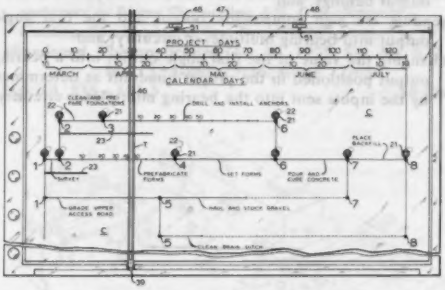
Filed May 9, 1975, Ser. No. 576,221

Int. Cl.² G09B *19/18*; G09F *3/18*; G06C *3/00*

U.S. Cl. 235—89 R **11 Claims**

1. Schedule control and monitoring apparatus for use in network type scheduling of a project having a plurality of interrelated activities with events at the start and termination thereof and wherein a succession of activities of the longest time path for the project are critical, said apparatus comprising a support frame, means for mounting on said frame a prepared chart on which a network schedule of such activities and events is written chronologically with the distance of consecutive critical activities drawn to scale representing scheduled times based on estimates of the durations to complete the respective activities, a plurality of magnets movably disposed on said frame behind said chart whereby the positions thereof can be changed, a plurality of markers of mag-

netic material adapted for disposition on the front face of said chart at said event points and supported by said magnets, an indicator bar mounted on said frame over said chart, and means for moving said indicator bar at a constant rate past



said markers from a position indicating the commencement of the project to provide a comparison between the actual progress of any given activity and the scheduled progress thereof.

4,019,028

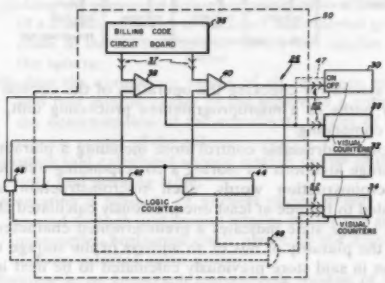
PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM

Demetrios Polyzoes, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 343,067, March 20, 1973. This application Nov. 25, 1974, Ser. No. 526,652

Int. Cl.² H03K *21/30*

U.S. Cl. 235—92 SB **2 Claims**



1. In a reproduction machine of the type which produces and delivers a number of copies of an original to a receiving means during a run of a job, the improvement which comprises:

a. first means for counting the total number of copies of an original delivered to the receiving means, second means for counting each copy of an original up to a first predetermined number which is delivered to the receiving means, and third means for counting the number of runs that exceed a predetermined length, the first, second, and third counting means including a plurality of counters for presenting visual indications of the events counted, and

b. means for enabling at least some of the counters in accordance with a predetermined program, a billing circuit board detachably connected to the enabling means by mating connectors for defining the predetermined program, and means for detecting when a copy has been deposited in the receiving means and for sending an input to the counters in accordance with the predetermined program.

4,019,029

MONITORING APPARATUS FOR CHECKING THE REGULARITY OF THE OPERATION OF LOGIC SYSTEMS

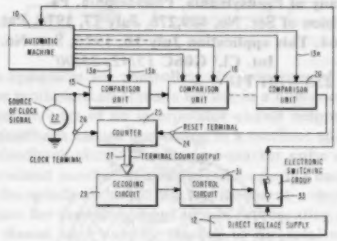
Mario Pozzetti, Bologna, Italy, assignor to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivogliio-S. Marino, Italy

Filed Nov. 14, 1975, Ser. No. 631,945

Claims priority, application Italy, Nov. 22, 1974, 3524/74

Int. Cl.² G06M *3/02*

U.S. Cl. 235—92 PD **12 Claims**



1. A monitoring apparatus for checking the regularity of the operation of a logic system, comprising a source of a clock signal, a series of comparison units connected to said source adapted to compare the signals of determined pairs or groups of logic signals; a detecting device adapted to check the presence of the clock signal at the output of said seris; alarm means connected to the output of the detecting device, said detecting device comprising counting means having a first input, of clock, connected to the source of the clock signal, a second input, of reset, connected to said output of the series, and an output of terminal count connected to decoding means adapted to control said alarm means when the counting on said terminal count output reaches a predetermined value, first switching and consent means adapted to stop the operation of the logic system; checking means adapted to simulate an alarm state and second consent means connected to the first switching and consent means and to the checking means for making the continuation of the operation of the logic system depend on the working conditions of the monitoring apparatus.

4,019,030

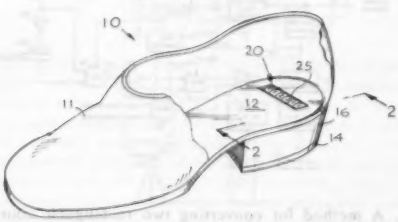
STEP-COUNTING SHOE

Farouq M. Tamiz, 530 Howard St., Alhambra, Calif. 91801

Filed Nov. 3, 1975, Ser. No. 627,897

Int. Cl.² G01C *22/00*; A43B *19/00*

U.S. Cl. 235—105 **7 Claims**



1. A step-counting shoe comprising:

a shoe member provided with heel means;

said heel means having hollowed portion means;

step-counting means disposed within the hollowed portion means and secured to said heel means;

operating means, reciprocally displaceable between non-

counting and counting positions, for actuating said step-counting means;

said operating means being disposed within said hollowed portion means and including pin means extending through an aperture in the base of said heel means in the non-counting position; and

means for biasing said operating means to the non-counting position.

4,019,031

REGISTER PRICE WHEEL STRUCTURE

Einar T. Young, Newtown Square, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Division of Ser. No. 489,275, July 17, 1974, Pat. No. 3,920,964. This application July 10, 1975, Ser. No. 594,935

Int. Cl.² G06C *15/42, 25/00*

U.S. Cl. 235—131 FD **4 Claims**

1. In a counter, a supporting shaft, a number wheel rotatably mounted on the shaft, a driven gear for rotating the number wheel during a counting operation, and means for applying a frictional force against said gear and including an arm mounted on and supported by said shaft adjacent to said driven gear, and a leaf spring secured to said arm and being biased against said driven gear to exert a substantially constant drag upon said gear as the latter rotates.

4,019,032

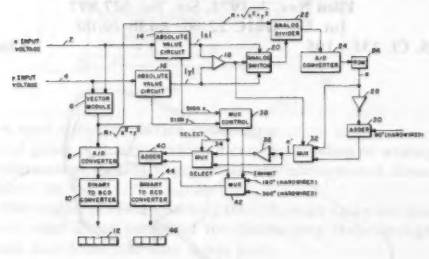
X-Y TO RANGE-BEARING CONVERTER

Edward J. McDevitt, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 14, 1976, Ser. No. 648,984

Int. Cl.² G06J *1/00*

U.S. Cl. 235—150.5 **9 Claims**



1. A method for converting two rectangular coordinate analog inputs into range and bearing digital outputs, comprising the steps of:

producing an analog range output from said analog inputs and digitizing the analog range output in an analog-to-digital circuit,

producing by circuit means a digital trigonometric value calculated with said two analog inputs,

feeding the digital trigonometric value into a read-only memory and producing a first angle output, corresponding to said trigonometric value,

comparing the signs of the rectangular coordinate analog inputs to determine into which quadrant the first angle output belongs, and

sending the sign comparison output and the first angle output into bearing multiplexer circuitry, and

changing the value of the first angle output into a bearing output positioned in the proper quadrant as determined by the inputs sent into the bearing multiplexer circuitry.

4,019,033

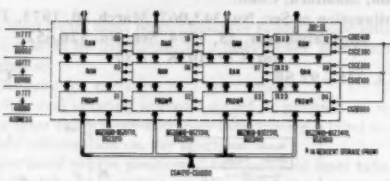
CONTROL STORE CHECKING SYSTEM AND METHOD

Arthur A. Parmet, Waltham, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Dec. 29, 1975, Ser. No. 644,678

Int. Cl.² G11C *29/00;* **G06F** *11/10*

U.S. Cl. 235—153 AM **22 Claims**



1. A system for checking the operation of the circuits and transfer paths of a microprogrammed processing unit, said system comprising:

a cycled addressable control store including a plurality of storage locations for storing a corresponding number of microinstruction words, each microinstruction word coded to include at least one previously calculated check bit whose state indicates a predetermined characteristic of the plurality of bits of an address of the storage location in said store previously calculated to be next in sequence;

first address register means coupled to said store for storing said address for referencing said plurality of storage locations and operatively coupled to receive a signal corresponding to said check bit during the read out of each microinstruction word;

second register means coupled to said store for storing at least a portion of the microinstruction word read out from an addressed location during an operative cycle of said control store;

decoding means coupled to said second register means for generating a plurality of control signals;

increment circuit means coupled to said first register means for incrementing said address by one; and,

first checking means coupled to said address register means, said checking means being operative to perform continuously a checking operation upon said address and said check bit stored in said first register means in response to at least a first one of said control signals for verifying when any one of said number of circuits is not operating properly.

4,019,034

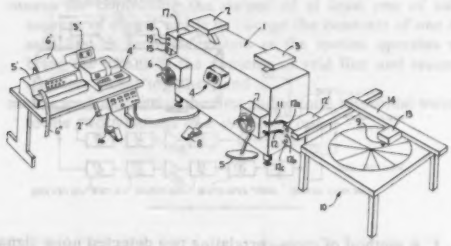
METHOD FOR DETERMINING THE INTERIOR SHAPE OF SPHERICAL TANKS FOR THE COMPUTATION OF THE LIQUID VOLUME OF THE TANKS, AND DEVICE FOR CARRYING OUT THE METHOD

Ole H. Blom, Stabekk, and Rolf Bakken, Oslo, both of Norway, assignors to Bloms Oppmaling A/S, Oslo, Norway

Continuation-in-part of Ser. No. 498,731, Aug. 19, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 624,448

Int. Cl.² G06F *15/36*; G01F *17/00*

U.S. Cl. 235—151.3 10 Claims



1. A method for determining the interior shape of a spherical tank for the computation of the liquid volume of the tank, comprising the steps of:

establishing a predetermined number of measuring stations within the tank;

establishing an arbitrary system of coordinates, the location of said measuring stations being identified with reference to said system of coordinates;

placing a series of markers evenly distributed on the inner surface of the tank to form reference points which are measured by measuring instruments at said measuring stations in accordance with said system of coordinates;

photographing all said reference points to obtain double coverage of all the inner surface areas of the tank;

plotting the measured reference points onto a drawing table of a coordinatograph to establish a horizontal great circle plane of the sphere together with a first interim center of the sphere;

feeding the coordinate values of all reference points and said first interim center of the sphere to a computer for the determination of the coordinate values of a second interim center of the sphere;

plotting said calculated second interim center of the sphere onto said drawing table;

generating a plurality of vertical planes evenly angularly spaced through said second interim center and generating intersecting horizontal circle planes on the drawing table to form selected other points;

forming in an autograph stereoscopic models of the inner surface of said tank using the double coverage photographs, said autograph being associated with said coordinatograph with the drawing table;

obtaining a series of three-dimensional readings from said stereoscopic models in a predetermined system of coordinates, said readings including the identification of said reference points and said selected other points on the inner surface of said tank;

transferring all said three-dimensional readings to an interface unit wherein said readings are registered and converted into field coordinates;

calculating on the basis of all three-dimensional readings the final mean radius of the sphere, the coordinate values of the final center of the sphere and the deviation from the mean radius for every point of reading;

calculating on the basis of said three-dimensional readings the mean radius of said small circles; and

calculating the volume of each of the areas between adjacent small circles to determine the total volume of said tank.

4,019,035

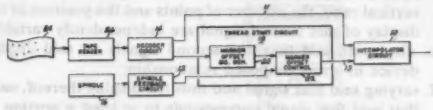
METHOD AND APPARATUS FOR CONTROLLING THE INITIATION OF MULTIPLE START THREADING CUTS

Randall Curtis Tanner, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Jan. 23, 1976, Ser. No. 651,938

Int. Cl.² B23G *3/04*

U.S. Cl. 235—151.11 10 Claims



1. An apparatus for controlling the initiation of threading spans for multiple start threads for use in a numerical control comprised in part of an interpolator circuit responsive to a spindle feedback circuit connected to a machine spindle, said spindle feedback circuit producing a marker pulse and a first predetermined number of spindle pulses during each revolution of the spindle, wherein the improvement comprises:

a. means for providing input signals representing a particular thread start number relative to the total number of threading starts;

b. means responsive to the input signals and a reference signal representing the first predetermined number of spindle pulses for producing a control signal representing a second number of spindle pulses as a function of the ratio of the particular thread start number to the total number of threading starts; and

c. means having inputs responsive to the marker and spindle pulses and the control signal and an output connected to the interpolator circuit for inhibiting the transfer of spindle pulses to the interpolator circuit as a function of the control signal.

4,019,036

METHOD FOR THE RATIONAL APPLICATION OF PATTERNING SIGNALS TO A PATTERNING DEVICE, TOOLS ADAPTED TO PRODUCE A PATTERN AND AN APPARATUS FOR CARRYING OUT THE SAME

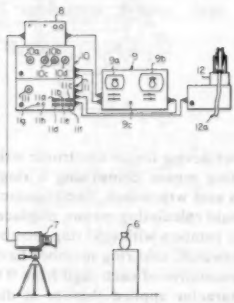
Takashi Hiramatsu; Akihiko Oe; Atsushi Fukuda; Masaki Fuse, and Tatsujiro Mori, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Dec. 11, 1974, Ser. No. 531,701

Claims priority, application Japan, Aug. 30, 1974, 49-99615

Int. Cl.² D04B *15/78*

U.S. Cl. 235—151.1 11 Claims



1. A method for applying a pattern, corresponding to at least a portion of an object, to an article, said method forming basic pattern information which controls a machine for applying said pattern onto said article in accordance with a pattern information signal, comprising the steps of:

a. generating a television signal corresponding to said object;
b. generating a first electrical signal as a function of variations in said television signal resulting from at least one of the gradations, colors or irregularities in said object;
c. displaying said first signal on a display device;
d. generating a second electrical signal which can be displayed on said display device as at least one of a group of points or a group of boundary lines wherein the dimensions of the display of said second signal, horizontal to vertical ratio, the number of points and the position of the display of said second signal are independently variable;
e. displaying said first and second signals on said display device in a superimposed relationship;
f. varying said first signal and thus the display thereof, such that said first signal corresponds to at least a portion of said object;
g. monitoring the variations of said first signal with said second signal superimposed thereon on said display device;
h. generating a third electrical signal corresponding to said varied first signal at the points at which said second signal is superimposed thereon;
i. applying said third signal to said machine for applying said pattern to said article for controlling said machine.

4,019,037

ELECTRONIC WRISTWATCH INCORPORATING CALCULATOR

Takashi Monna, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 27, 1972, Ser. No. 319,070
Claims priority, application Japan, Dec. 27, 1971, 46-2875; Dec. 27, 1971, 46-2876
Int. Cl.² G06F 7/48, 3/02; G04B 19/30
U.S. Cl. 235—156 **4 Claims**

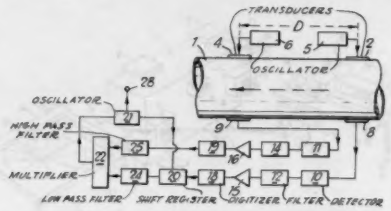
1. An input device for an electronic wristwatch incorporating calculating means comprising a ring member rotatably mounted on said wristwatch, fixed contact means operatively coupled to said calculating means, displaceable contact means mounted for rotation with said ring member, and mark means on said wristwatch, said ring member having numerical characters representative of each digit from 0 to 9 and at least one function character applied thereto at discrete circumferentially spaced positions; at least one of said fixed and movable contact means including a plurality of contact elements respectively associated with said numerical and function characters and positioned for electrical engagement between the contact element associated with the character aligned with said mark means and the other of said fixed and movable contacts.

4,019,038

CORRELATORS

Donald Louis Critten, and Peter Alan Johnson, both of Luton, England, assignors to Kent Instruments Limited, Luton, England

Continuation of Ser. No. 261,327, June 9, 1972, abandoned. This application Mar. 4, 1975, Ser. No. 555,250
Claims priority, application United Kingdom, June 10, 1971, 27366/71; Feb. 3, 1972, 5184/72
Int. Cl.² G06F 15/34
U.S. Cl. 235—181 **11 Claims**



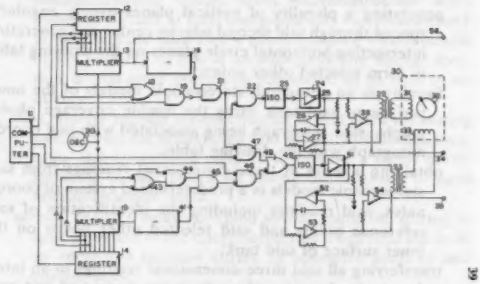
1. A method of cross-correlating two detected noise signals representative of respective random variations in a moving medium and having a net time delay between similar characteristics thereof, the method including the steps of deriving a pair of noise signals in the form of pulse trains representative of respective random variations, imposing a time delay on the noise signal derived from a leading one of the random variations, effecting a relative phase shift substantially equal to an odd number multiple of 90° between the pair of noise signals, obtaining the product of the noise signal derived from a trailing one of the random variations and the delayed signal derived from the leading one of the random variations, after effecting the said phase shift, and adjusting the time delay imposed on the noise signal derived from the leading one of the random variations to reduce the said product to zero.

4,019,039

SYNCHROSCOPE SIMULATOR

Robert Richard Fontaine, Riverdale, Md., assignor to The Singer Company, Binghamton, N.Y.

Filed Nov. 28, 1975, Ser. No. 635,577
Int. Cl.² G06G 7/48; G01R 25/00
U.S. Cl. 235—184 **10 Claims**



1. Apparatus for simulating a synchroscope system, said apparatus comprising:
a first register and a second register;
a first rate multiplier connected to receive the contents of said first register;
a second rate multiplier connected to receive the contents of said second register;
an oscillator connected to said first and second rate multipliers to supply the rate by which the contents of said first and second registers are multiplied;

at least one source of digital information connected to the inputs of said first and second registers to supply individual digital words representing a frequency to said first and second registers;

a first filter means coupled to the output of said first multiplier to convert the first multiplier output into a first sinusoidal wave having a frequency equal to the digital word stored in said first register;

a second filter means coupled to the output of the second multiplier to convert the output of the second multiplier into a second sinusoidal wave having a frequency equal to the digital word stored in said second register;

means for controlling the output of at least one of said sources of digital words to change the contents of one of said first or second registers as the system operates to bring the values of the contents of said first and second registers closer together; and

means for transmitting the first and second sinusoidal waves to the two windings of a synchroscope.

4,019,040

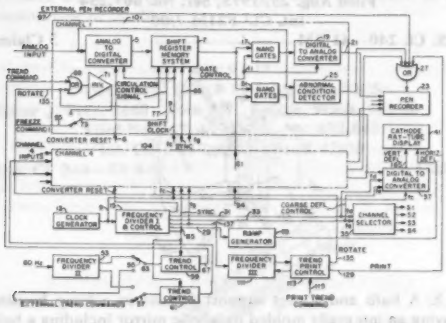
CRT DISPLAY AND RECORD SYSTEM

Francis T. Thompson, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 402,686, Oct. 2, 1973, abandoned, which is a continuation of Ser. No. 197,469, Nov. 10, 1971, abandoned. This application Mar. 27, 1975, Ser. No. 562,618

Int. Cl.² G06F *3/14*

U.S. Cl. 235—92 SH **2 Claims**



1. Apparatus for processing digital input signals, comprising, a shift register memory means adapted to sequentially receive input signals and store a predetermined number of said input signals as input signal information, clock means connected to said shift register memory means to advance said input signals through said shift register memory means causing the oldest stored input signal to be discarded in response to each new input signal received by said shift register memory means, logic control means, including means for selecting a first and second mode of operation, operatively connected to said shift register memory means to selectively gate said input signals to said shift register means at a first and second rate, and visual display means operatively connected to said shift register memory means to display the input signal information stored in said shift register memory means, the rate of introducing input signals to said shift register memory means in said first mode of operation producing a slowly moving display, said rate of introducing input signals to said shift register memory means in said second mode of operation being less than the rate corresponding to said first mode of operation and producing an essentially stationary display.

4,019,041

FLASH APPARATUS WITH CABLE STORAGE SPACE

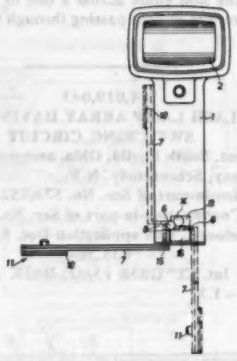
Claus Prochnow, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Sept. 16, 1975, Ser. No. 613,760

Claims priority, application Germany, Sept. 28, 1974, 2446411

Int. Cl.² G03B *15/02*; F21V *7/00*

U.S. Cl. 240—1.3 **10 Claims**



1. Photographic flash apparatus comprising a body portion, a synchronous connection cable for electrical connection with a camera with which the flash apparatus is used, and a mounting arm pivotally attached to said body portion for supporting said body portion from said camera, characterized by the fact that:

a. said body portion has a cavity serving as a storage compartment for said cable when not in use;

b. one end of said cable is connected to said body portion within said cavity;

c. said mounting arm is arranged for swinging movement to a plurality of positions of orientation relative to said body portion; and

d. in one of said positions, said mounting arm overlies and serves as a closure for said storage cavity.

4,019,042

LIGHTING DEVICE FOR PHOTOGRAPH OR MOTION-PICTURE PHOTOGRAPHY

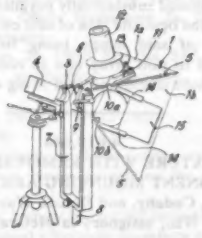
Mardick Baliozian, Feucherolles, France, assignor to Tolec, Neuilly-Plaisance, France

Filed Sept. 19, 1975, Ser. No. 614,782

Claims priority, application France, Sept. 26, 1974, 74.32418

Int. Cl.² G03B *15/02*

U.S. Cl. 240—1.3 **8 Claims**



1. In combination with a light source and with a camera having a lens, a lighting device comprising: an opaque reflector of truncated shape having a base wall formed with an opening and a side wall flaring outwardly from said base wall

and formed with a pair of offset lightpassing windows; said reflector with said opening aligned with said lens, whereby said camera can take a picture through said opening; means for securing said light source outside said reflector at one of said windows in a position wherein light emitted by said source is reflected by the interior of said reflector at an object viewable by said camera through said opening, said light source being out of line with said lens in said position; and means including a guide on said reflector and an opaque slide displaceable along said guide across a one of said windows for varying the amount of light passing through the thus equipped window.

4,019,043

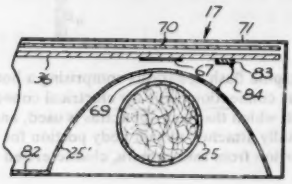
PHOTOFLASH LAMP ARRAY HAVING SHIELDED SWITCHING CIRCUIT

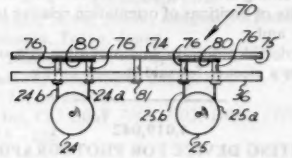
Richard Blount, South Euclid, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 574,752, May 5, 1975, abandoned, Continuation-in-part of Ser. No. 520,451, Nov. 4, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,364

Int. Cl.² G03B *15/02*; **H05K** *1/00*

U.S. Cl. 240—1.3 **22 Claims**





1. A multiple flash lamp array comprising a plurality of flash lamps of the electrically fired type, a circuit board having circuitry on one side thereof for sequentially firing said lamps, and means electrically connecting said lamps to said circuitry, wherein the improvement in said array comprises an electrically conductive shield in the form of a conductive sheet member connected electrically to said sequential firing circuitry and positioned substantially parallel to and spaced from at least part of the opposite side of said circuit board to reduce the likelihood of said lamps being fired by electrostatic charges applied to said array and to reduce capacitive coupling between said shield and said firing circuitry.

4,019,044

LIGHTING FIXTURE WITH REMOVABLE ELECTRICAL COMPONENT MOUNTING ARRANGEMENT

James P. Kelly, Cudahy, and Donald Wandler, South Milwaukee, both of Wis., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Oct. 10, 1975, Ser. No. 621,419

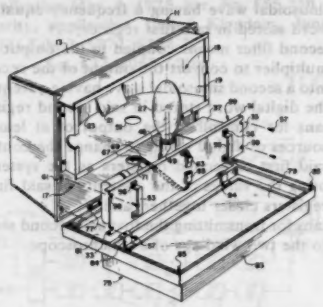
Int. Cl.² F21S *13/10*; **F21V** *23/02*

U.S. Cl. 240—25 **19 Claims**

1. A lighting fixture comprising:

a housing having an energization compartment therein;

electrical component mounting means on which electrical components for controlling energization of a lamp are mounted, said electrical component mounting means adapted to be removably inserted into said energization compartment;



lamp supporting means affixed to said electrical component mounting means to hold the lamp and convey electrical power thereto; and

electrical connector means for selectively conveying electrical power to said electrical components and said lamp supporting means.

4,019,045

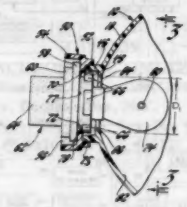
SOCKET MOUNTING CAP

Norman W. Bassett, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 25, 1975, Ser. No. 607,254

Int. Cl.² F21M *7/00*

U.S. Cl. 240—41 BM **3 Claims**



2. A bulb and socket support for use in a lamp housing having an integrally molded parabolic mirror including a bulb access opening therein and an outwardly extending socket collar the improvement comprising: a radially inwardly directed mirror segment on the integrally formed support collar to define an access opening into the parabolic mirror having an inside diameter less than 10 percent greater than the outside diameter of the bulb inserted therethrough and to define an annular light interception surface for reducing light reflection loss at the access opening into the parbolic mirror, a bulb socket and bulb with sealing gasket having a reference surface, a socket mounting cap supported on the outer end of the support collar including an outboard flange formed continuously around said gasket to define a socket sealing gasket shield at the socket sealing gasket reference surface, the inside diameter of the outboard flange being greater than the outside diameter of the sealing gasket to cover the socket reference surface to prevent ingress of foreign material into the interior of the mirror housing, said mounting cap including a support wall to supportingly receive the socket and an outboard surface to sealingly engage the sealing gasket, the support collar and socket mounting cap support wall maintaining said bulb at a position to locate its filament at a focal length wherein a

cone of generated light therefrom will be intercepted by the light interception surface for reflection therefrom to minimize excessive loss of reflector efficiency at the socket support.

4,019,046

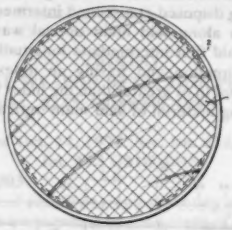
HEADLIGHT SAFETY COVER

Lawrence Edwin Reynolds, Colony St., Meriden, Conn. 06450

Filed July 16, 1975, Ser. No. 567,408

Int. Cl.² F21J *9/08*

U.S. Cl. 240—46.59 **2 Claims**



1. A headlight safety cover to be fitted over the headlight of a motorcycle or the like to improve visibility of the motorcycle when the headlight is illuminated during daylight hours comprising: a colored lens having a size and shape adapted to overlie substantially the entire headlight lens; an attachment sleeve connected to the periphery of the colored lens and having clamp-like springs for holding the colored lens on the headlight; and resilient bumpers within the attachment sleeve positioned for engagement with the exterior of the headlight and having a resiliency permitted vibrating movement of the colored lens relative to the headlight upon movement of the motorcycle or the like.

4,019,047

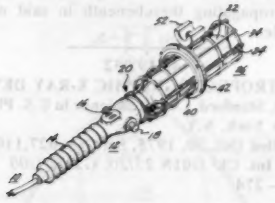
TROUBLE LAMP FOR MECHANICS

Oscar J. Frey, 8660 - 46th SW., Seattle, Wash. 98136

Filed Nov. 17, 1975, Ser. No. 632,640

Int. Cl.² F21V *15/00*; **F16B** *47/00*

U.S. Cl. 240—54 A **6 Claims**



1. In a trouble-lamp of the type wherein a light bulb is mounted in a socket at an end of an extension cord and a protective openwork cage, non-rotatably attached to the socket, surrounds said light bulb, and light shield means is provided within said cage to preclude light emanations along one side of said light bulb, the improvement comprising:

an open-centered discoidal member;

an annular member, channel-shaped in cross-section rotatably interfitted to an edge of said discoidal member to permit relative rotation about a common axis of one member with respect to the other member;

one of said members being fixedly secured intermediate of the length of said protective cage; and

the other of said members being fixedly secured to a magnet for mounting on magnetically attractive means proximate to a work area to be illuminated.

4,019,048

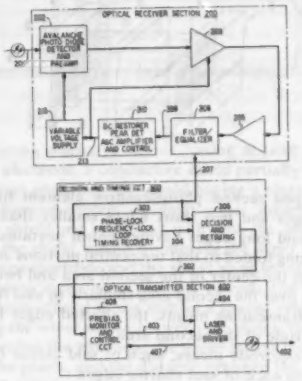
REGENERATOR FOR AN OPTICAL TRANSMISSION SYSTEM

Theodore Lincoln Maione, Little Silver; Frederick Enyeart Radcliffe, Lavallette; Darrell Dean Sell, Holmdel, and Dan Holden Wolaver, Edison, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 22, 1976, Ser. No. 668,851

Int. Cl.² H04B *9/00*

U.S. Cl. 250—199 **34 Claims**


OPTICAL RECEIVER SECTION 202
AVALANCHE PHOTODIODE DETECTOR AND PREAMP
VARIABLE VOLTAGE SUPPLY
D.C. RESTORER PEAK DET AGC AMPLIFIER AND CONTROL
FILTER/ EQUALIZER
DECISION AND TIMING CKT 300
PHASE-LOCK FREQUENCY-LOCK LOOP TIMING RECOVERY
DECISION AND RETIMING
OPTICAL TRANSMITTER SECTION 400
PREBIAS MONITOR AND CONTROL CCT
LASER AND DRIVER

1. An optical pulse stream regenerator comprising

means for receiving an optical data pulse stream and converting it to an electrical data pulse stream representing the received optical data pulse stream;

means responsive to the electrical data pulse stream from the receiving means for recovering a clock pulse stream synchronized with the received optical data pulse stream;

means responsive to the clock pulse stream and to the electrical data pulse stream from the receiving means for regenerating an electrical data pulse stream representing the received optical data pulse stream; and

an optical transmitter including an injection laser responsive to the regenerated electrical data pulse stream and to a prebias signal, which is established in response to the difference between a signal representing the optical output of the laser and a signal representing the regenerated electrical data pulse stream, for regenerating an optical output data pulse stream representing the received optical data pulse stream.

4,019,049

PHOTOELECTRIC TRANSDUCING UNIT AND SYSTEM FOR DETECTING THE SHARPNESS OF THE IMAGE OF OBJECT BY MEANS OF THE UNIT

Hansrichard Schulz, Obere Waistrasse 2a, D-773 Villingen, Black Forest, Germany

Filed Jan. 30, 1975, Ser. No. 545,473

Claims priority, application Germany, Feb. 8, 1974, 2406045

Int. Cl.² H01J *39/12*

U.S. Cl. 250—211 R **65 Claims**

1. A light-to electrical signal conversion unit, comprising:

electrical insulation means permitting the passage of light therethrough,

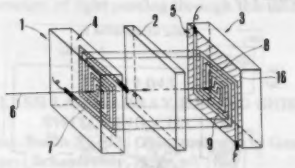
first photoelectric transucing means including;

a pair of strip-shaped electrode members each having two long edges and two short edges smaller than the long edges, each of said electrode members being disposed over an area of said insulating means so that the member never crosses itself, one of the short edges of each member being disposed near the center of the area, said members being bifilar wound relative to each other over the

area, the other short edge on each member being disposed at the outside of the area,

a first photosensitive element disposed between said bifilar wound members,

second photoelectric transducing means disposed on said insulating means over a second area opposing the first photoelectric transducing means, said second photoelectric transducing means including;



a belt-shaped second photosensitive element having two long edges and two short edges smaller than the long edges, said long edges having central portions, said element being folded so that the central portions are situated nearly at the center of the second area and being wound bifilarly over the second area similarly to said first photoelectic transducing means, the shorted edges being situated outside of the second area,

a pair of electrode pieces, each of said pieces being connected to each of said shorter edges.

4,019,050

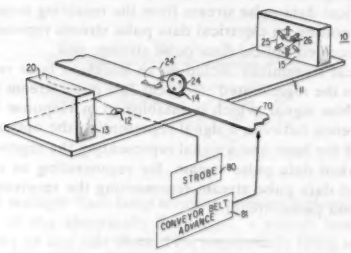
OPTICAL INSPECTION SYSTEM

Norman N. Axelrod, 445 E. 86th St., New York, N.Y. 10028

Filed June 17, 1975, Ser. No. 587,543

Int. Cl.² G01B *11/24*

U.S. Cl. 250—222 R **2 Claims**



1. Apparatus for inspecting an image of one or more objects having identical significant features (object), said apparatus including means for producing an image of (an object) said one or more objects in an image plane, means comprising a plurality of detectors placed in (different) identical positions (of like geometry) with respect to said significant features (image), and means coupled to detectors situated alike with respect to different identical features in pairs and responsive to outputs therefrom for producing a signal only when said outputs are different.

4,019,051

DIRECTIONAL OPTICAL WAVEGUIDE COUPLERS

Stewart Edward Miller, Locust, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 24, 1975, Ser. No. 644,139

Int. Cl.² G02B *5/14;* **H01J** *5/16, 39/12*

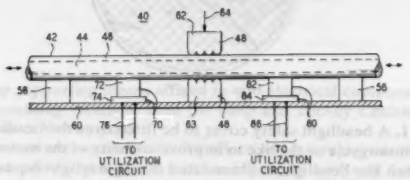
U.S. Cl. 250—227 **11 Claims**

1. A directional optical waveguide coupler comprising:

a main optical waveguide comprising a core capable of transmitting light energy in at least a first direction surrounded by a layer of cladding material having an index of refraction which is less than the index of refraction of said core material;

mode coupling means disposed at a first intermediate longitudinal position along said main optical waveguide capable of enhancing mode coupling from core-guided modes to cladding modes in said main optical waveguide;

means for transferring out of said cladding layer the cladding modes generated by said mode coupling means and propagating in said first direction for subsequent conversion to a representative electrical signal, said transferring means being disposed at a second intermediate longitudinal position along said main optical waveguide downstream of said first intermediate longitudinal position in said first direction and having an index of refraction which is equal to or greater than the index of refraction of said cladding material of said main optical waveguide;



a first stripper-absorber means comprising both a body of dielectric material disposed in coupling relationship with the cladding of said main optical waveguide and a light absorbing means and disposed along said main optical waveguide at a third intermediate longitudinal position upstream of said first intermediate position in said first direction for removing and absorbing cladding modes propagating therebeneath in said main optical waveguide; and

a second stripper-absorber means comprising both a body of dielectric material disposed in coupling relationship with the cladding of said main optical waveguide and a light absorbing means and disposed along said main optical waveguide at a fourth intermediate longitudinal position downstream of said second intermediate position in said first direction for removing and absorbing cladding modes propagating therebeneath in said main optical waveguide.

4,019,052

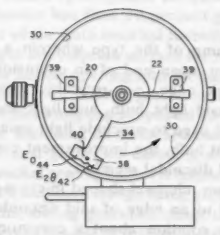
ELECTROPHOTOGRAPHIC X-RAY DEVICE

David J. Haas, Stanford, Conn., assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,110

Int. Cl.² G01N *23/20;* **G21K** *1/00*

U.S. Cl. 250—274 **13 Claims**



1. An electrophotographic diffractometer apparatus comprising

a. a photoconductive storage member;

b. means for uniformly charging said storage member;

c. means for holding a diffraction specimen;
d. means for directing a collimated beam of electromagnetic radiation to said specimen, whereby diffracted rays of said beam are directed to said charge storage member and produce discharged local areas thereon in accordance with the diffraction characteristics of said specimen; and
e. scanning means for electrically measuring the charge pattern at said storage member, said scanning means comprising said charging means and said measuring means.

4,019,053

LETHAL WEAPON DETECTION PROCESS

Jeffrey C. Levine, 6235 Springhill Drive, Greenbelt, Md. 20770

Filed Oct. 14, 1975, Ser. No. 622,388
Int. Cl.² G21H *5/02*
U.S. Cl. 250—303 **10 Claims**

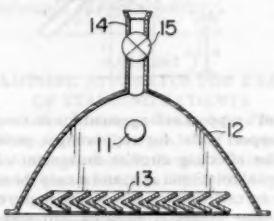
1. A method of identifying and detecting a weapon that is concealed from view comprising the steps of:
incorporating a radioactive marking material in the form of a coding in the weapon in a concealed manner that produces a non-visible code of radiation of sufficient intensity as to be detectable at a distance from the concealed weapon,
detecting such code of radiations at each location where it is desired to detect such weapon, such a detector being provided at locations including one of entranceways into rooms, vehicles, places of entertainment, windows, and other entrances and exits.

4,019,054

APPARATUS FOR FIXING TONER IMAGES

Kinzi Saito, Kawasaki, and Sadao Takahashi, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Japan

Filed July 21, 1975, Ser. No. 597,692
Claims priority, application Japan, July 19, 1974, 49-82940; May 7, 1975, 50-54827
Int. Cl.² G03C *5/16*
U.S. Cl. 250—319 **6 Claims**



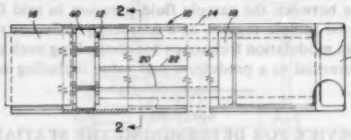
1. An apparatus for fixing toner images on a sheet bearing such images, comprising means for feeding the image-bearing sheets along a feed path, a housing overlying such feed path, an infrared light source in said housing; and light ray directing means between said light source and said feed path for directing the light from said source in a path to produce a first high temperature region along an initial portion of said feed path and a second high temperature region having temperature higher than said first high temperature region along the remaining portion of said path, said light ray directing means including a solid portion of said housing defined along the length of said feed path to produce the first high temperature region and a perforated portion extending along the remainder of the feed path defining the second high temperature region.

4,019,055

CORONA CLEANING ASSEMBLY

James L. Derleth, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 245,306, April 19, 1972, abandoned. This application June 6, 1973, Ser. No. 367,607
Int. Cl.² G03G *15/00*
U.S. Cl. 250—324 **1 Claim**



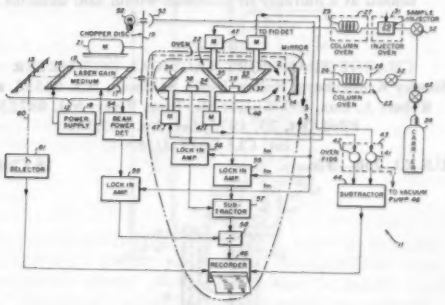
1. A corona discharge device having at least one corona discharge electrode, a conductive shield partially surrounding the discharge electrode, the shield having a plurality of guide channels formed therein, resilient wiper means positioned within the shield and in contact with both the discharge electrode and the shield, means for moving the wiper means along the discharge electrode and the shield so as to clean both, the moving means including a plurality of rods and at least two support plates affixed to the rods in a spaced relationship for supporting the wiper means between the plates, the rods being disposed within the channels, the wiper means being disposed between the plates, and the distance between the plates being less than the thickness of the wiper means so as to compress the wiper means between the plates.

4,019,056

INFRARED LASER DETECTOR EMPLOYING A PRESSURE CONTROLLED DIFFERENTIAL OPTOACOUSTIC DETECTOR

Barry Block, Los Altos Hills, and Harry E. Aine, Mountain View, both of Calif., assignors to Diax Corporation, Sunnyvale, Calif.

Filed Apr. 28, 1975, Ser. No. 572,013
Int. Cl.² G01J *3/42*
U.S. Cl. 250—344 **19 Claims**



1. In an infrared laser absorption detection apparatus:
means for producing a laser beam of coherent radiation;
means for providing first and second sample regions partitioned from each other;
means for disposing first and second fluid samples in said respective first and second sample regions;
means for directing at least a portion of the laser beam into at least one of said sample regions for irradiating said sample and for absorbing coherent radiation from the laser beam and for converting the absorbed coherent radiation into a second form of energy, wherein said second form of energy may be a pressure or acoustic wave;

means for modulating the laser beam at a modulation frequency to produce modulation of the infrared absorption and thus a modulation of the second form of energy;

absorption detector means coupled in energy exchanging relation with at least said irradiated sample region for detecting the modulated second form of energy resulting from the absorption of energy from the coherent infrared beam by said irradiated sample; and

pressure controller means responsive to the pressure difference between the sample fluid pressure in said first and second sample regions at a frequency different than the beam modulation frequency for controlling such pressure differential to a predetermined value including zero.

4,019,057

DEVICE FOR DETERMINING THE SPATIAL DISTRIBUTION OF RADIOACTIVITY WITHIN AN OBJECT

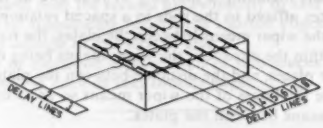
Stanley Bram, Paris, France, assignor to Institut Pasteur, France

Filed Feb. 26, 1975, Ser. No. 553,109

Claims priority, application France, Apr. 25, 1974, 74.14453

Int. Cl.² G01T *1/18*

U.S. Cl. 250—375 **14 Claims**



1. A method for determination of the spatial distribution of radioactivity in an object, comprising the steps of

a. placing said object inside the chamber of a position-sensitive radioactivity detector;

b. sealing said chamber;

c. introducing a gas into said chamber under pressure significantly higher than atmosphereic pressure;

d. sensing the location within said chamber of a particle emitted by said object; and

e. counting and displaying the number of such particles sensed at a plurality of locations within said detector.

4,019,058

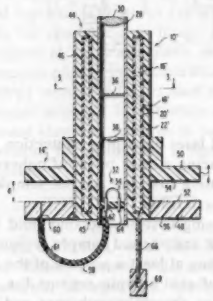
CHARGE TRANSPORT TACTICAL DOSIMETER

Stanley Kronenberg, Hollow Road, Skillman, N.J. 08558, and Robert A. Lux, 891 Knight St., Toms River, N.J. 08753

Filed Oct. 23, 1975, Ser. No. 625,341

Int. Cl.² G01T *1/18*

U.S. Cl. 250—376 **16 Claims**



1. A dosimeter comprising in combination:

electroscope means and indicator means therefor providing an indication of the charged state of the electroscope;

a variable capacitor electrically coupled in parallel with said electroscope;

a radiation detection capacitor formed of material of a relatively large atomic number surrounded by a material of less atomic number whereby exposure of radiation causes an electrical charge to be built up on said material of relatively large atomic number; and

means for transferring the charge from said detection capacitor to said electroscope and said variable capacitor, wherein said electroscope is charged thereby and said variable capacitor is reduced in capacitance value thereafter to raise the voltage on said electroscope to a predetermined value with the dose being determined by the reduction in capacitance of said variable capacitor necessary to raise the electroscope to said predetermined voltage.

4,019,059

PATIENT'S SUPPORT ARRANGEMENT FOR AN X-RAY APPARATUS

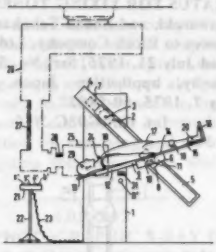
Bengt Brundin, Sundbyberg, and Wulf Trepte, Sollentuna, both of Sweden, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Nov. 18, 1975, Ser. No. 633,161

Claims priority, application Germany, Nov. 22, 1974, 2455447

Int. Cl.² G21K *5/08*

U.S. Cl. 250—451 **6 Claims**



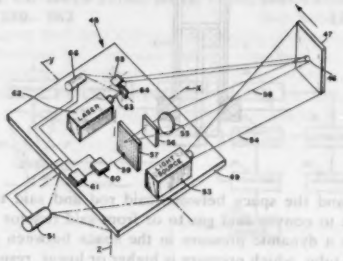
1. In a patient's support arrangement for an x-ray apparatus, including a support pallet for supporting a patient thereon; drive means for effecting circular movement of said pallet about a horizontal rotational axis; and means for adjusting said pallet relative to said rotational axis, the improvement comprising: said drive means comprising two servomotors for rotating said pallet about said horizontal axis in the region of a patient resting thereon; control means for controlling said servomotors, said control means including means for setting of reference values of the coordinates in space of the desired position of said rotational axis, sensing means in said control means for sensing of actual values of the coordinates of the acutal position of said rotational axis, follow-up contro means for actuating said servomotors when a difference prevails between said desired position and said actual position, said servo motors being acutated in directions for reducing said difference; said means for setting said reference values transmitting the desired position of said rotational axis in terms of coordinates of said support pallet, the coordinates of said support pallet corresponding to the coordinates of the patient, said reference values being in a coordinate system separate from the coordinate system of the position of said patient.

4,019,060

FLUORESCENCE LOCATING SYSTEM AND METHOD

Douglas P. Woodman, Menlo Park, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Filed Oct. 3, 1975, Ser. No. 619,388
Int. Cl.² G01N 21/38
U.S. Cl. 250—461 R 4 Claims



1. An automatic tracking system for an object having a trackable surface composed of first and second substances at different locations on the object comprising

optical transmitter means having an output beam with a first wavelength directed toward said object whereby to illuminate all of said trackable surface with said light and cause said first and second substances to emit light at second and third wavelengths, respectively,

a receiver responsive to light at said second wavelength and unresponsive to light at said third wavelength, said receiver having an optical transducer array capable of producing an electrical output signal corresponding to the position of incidence of said second wavelength light on said array,

logic circuit means receiving the output of said array and deriving an error signal proportional to the deviation of said position of incidence of said first wavelength light from a reference position on said array,

a laser adapted to produce an output beam and

a steering mechanism for said laser beam,

said beam steering mechanism being connected to said logic circuit means and being responsive to said error signal for steering said laser beam for incidence on said first substance on said object.

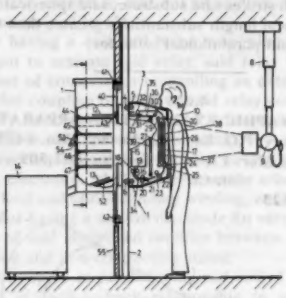
4,019,061

X-RAY EXAMINING APPARATUS FOR EXAMINATION OF STANDING PATIENTS

Johann Finkenzeller, Erlangen-Tenneniohe; Fritz Bronnert, and Karl Weiss, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 501,071, Aug. 27, 1974, abandoned. This application May 20, 1976, Ser. No. 688,724
Claims priority, application Germany, Sept. 12, 1973, 2346024
Int. Cl.² G11B 1/00
U.S. Cl. 250—470 7 Claims

1. In an X-ray examining apparatus for the examination of standing patients, including support means supporting an X-ray tube; an exposure installation; a rack mounting said exposure installation for vertical adjustment thereof; a supply magazine for film sheets having first conveying means for conveying unexposed film sheets from said magazine into an exposure position in said exposure installation; and second conveying means for conveying exposed film sheets from said exposure position into an automatic developing arrangement, the improvement comprising X-ray protective screen means positioned rearwardly of said exposure position, said supply magazine for unexposed film sheets being located, in the direction of the incoming X-radiation, rearwardly of said exposure position and of said X-ray protective screen means for reducing the width of the exposure installation to a maximum of twice the width of the maximum exposure format and to a maximum width of 80 centimeters, said first and second conveying means for conveying unexposed film sheets into the exposure position and exposed film sheets from said exposure



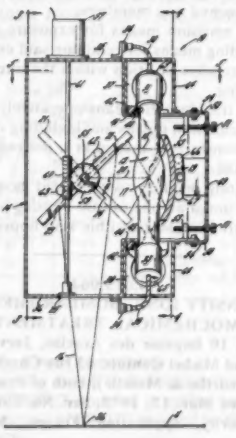
position being conducted through the region of said X-ray protective screen means, said first conveying means conveying said unexposed film sheets from below upwardly into the exposure position, and said second conveying means conveying said exposed film sheets from upwardly out of the exposure position.

4,019,062

UNIT FOR TREATMENT OF SUBSTRATE WITH ULTRAVIOLET RADIATION

Eric H. Rongren, 22 W 750 Elmwood Ave., Glen Ellyn, Ill. 60137

Filed Sept. 11, 1975, Ser. No. 612,301
Int. Cl.² F26B 3/30
U.S. Cl. 250—492 R 14 Claims



1. A unit for treating a substrate with ultraviolet radiation, said unit comprising:

a housing spaced from the substrate;

at least one radiation producing source carried by said housing;

a paraboloidal reflector carried by said housing adjacent each of said sources, with said source being located substantially at the focus of said paraboloidal reflector so that the reflector produces a generally collimated beam of radiation oriented generally parallel to the substrate;

a concave, spherical reflector carried by said housing for each of said paraboloidal reflectors, said spherical reflector being spaced away from said source and said paraboloidal reflector and intercepting said collimated beam and reflecting the same so that the rays of said beam converge toward each other upon progressing toward said substrate to thereby concentrate the radiation intensity of said beam which strikes said substrate, said spherical reflector having a focal length substantially greater than the focal length of said paraboloidal reflector.

4,019,063

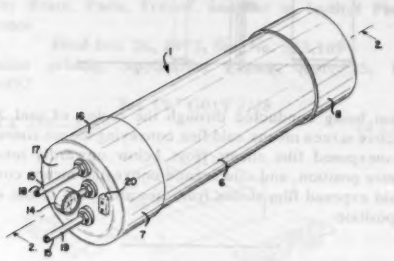
RADIOGRAPHIC EXAMINATION APPARATUS

Leonard O. Curry, P.O. Box 152, Nevada, Mo. 64772

Filed Mar. 17, 1976, Ser. No. 667,509

Int. Cl.² H01J *7/44*

U.S. Cl. 250—523 **10 Claims**



1. A radiographic examination apparatus comprising:

a. an elongated tubular housing having a side wall and opposite end portions;

b. first and second cap members each mounted on a respective one of the end portions of said housing to close same and define an interior chamber;

c. seal means for and in engagement with each of the opposite end portions of said housing and with said respective first and second cap members;

d. radiation emission means for exposure of photographic film including means for retaining said emission means in a desired relative position within the interior chamber of said housing;

e. electrical transformer means operatively coupled to said radiation emission means and including means for retaining said transformer means in a desired position within said chamber; and

f. an insulating medium within said housing and gauge means mounted on one of said housing and cap members for measuring pressure within said housing.

4,019,064

HIGH INTENSITY IONIC BOMBARDMENT REACTOR FOR THERMOCHEMICAL TREATMENT PROCESSES

Henri Michel, 10 impasse des Acacias, Jarville (Meurthe & Moselle), and Michel Gantois, 63 rue Charles Gounod, Vandoeuvre (Meurthe & Moselle), both of France

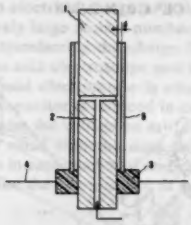
Filed Mar. 17, 1975, Ser. No. 558,896

Claims priority, application France, Mar. 19, 1974, 74.09227

Int. Cl.² B01K *1/00;* **C21D** *1/00*

U.S. Cl. 250—543 **3 Claims**

1. In a high intensity ionic bombardment reactor for submitting an object to thermochemical treatment with a reactive treatment gas in which the interior surface of said reactor is at anodic potential with a cylindrical metal rod at cathodic potential insulatedly disposed on the surface of the reactor, said rod being operative to support said object, the improvement comprising a cylindrical tube insulatedly disposed on said reactor surface coaxially with and surrounding a portion of said rod, the interior of said tube being spaced from said rod at a constant distance which is as small as possible and less than the dark field dimension δ, said rod including at least one gas circulating duct communicating with the exterior of the



reactor and the space between said rod and said tube and operable to convey said gas to or from said reactor so as to maintain a dynamic pressure in the space between said rod and said tube, which pressure is higher or lower, respectively, then the average pressure in said reactor.

4,019,065

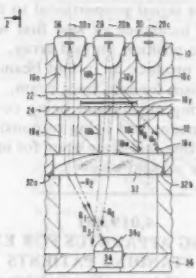
MULTIPLEXING DOCUMENT CARD READER WITH CONVEX LENS

Ralph Emil Beastrom; Arlen John Bowen; Ronald James Keller, all of Rochester, and David George Nutt, Dodge Center, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,240

Int. Cl.² H05B *33/00;* **G06K** *7/10;* **H01J** *39/12*

U.S. Cl. 250—553 **6 Claims**



1. A reader for a document card having data representative openings therethrough disposed in a plurality of columns, said reader comprising:

a plurality of light sources disposed in a row and producing parallel output light rays,

means providing a path of travel for the document card so that it may cut said light rays and so that its said openings in one of its said columns respectively line up with the light rays from said light sources to allow the light rays to pass therethrough,

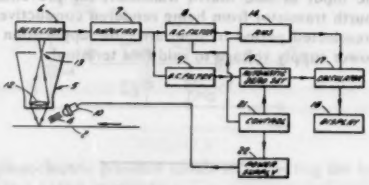
a light detector positioned directly in line with the light ray from a middle one of said light sources but being of such restricted size that it is not in line with the light rays from the other ones of said light sources, and

a convex lens positioned to have the light rays from said light sources impinge on a convex surface of the lens so that the lens converges the light rays from said light sources to cause all of the light rays to impinge on said light detector.

4,019,066
MEASURING THE SURFACE ROUGHNESS OF A MOVING SHEET MATERIAL

John M. Lucas, Montreal, and Serge Gracovetsky, St. Lambert, both of Canada, assignors to Domtar Limited, Montreal, Canada

Filed Mar. 25, 1975, Ser. No. 561,900
Claims priority, application Canada, Apr. 16, 1974, 197731
Int. Cl.² G01N *21/32*; G01B *11/30*; G01N *21/48*
U.S. Cl. 250—562 **12 Claims**

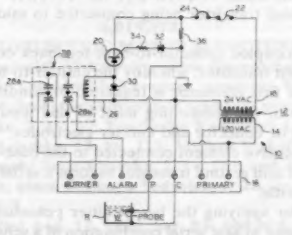


1. An apparatus for the on-line measuring of the surface roughness of a moving web which comprises;
- illuminating means for projecting a beam of light obliquely onto the surface of said web;
- collector means disposed to collect scattered light reflected at a non-specular angle from a small area of said surface;
- a support structure adapted to be placed adjacent said surface, said illuminating means and said collector means being fixedly set in said support;
- means providing relative movement between said web and said support thereby to collect reflected light from a multiplicity of small areas sequentially appearing in front of said collector means;
- photoelectric means for converting the light collected from the said small areas into electrical signals;
- and analyzer means for converting said electrical signals into an index of roughness, said analyzer means comprising means for dividing said electrical signals into a direct component and on alternating component and for computing the ratio of said alternating to said direct component, said ratio providing said index of roughness.

4,019,067
CONDUCTIVE PROBE LEVEL CONTROL

Roland Aaron Gladstone, Morton Grove, Ill., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,380
Int. Cl.² G01F *23/00*
U.S. Cl. 307—118 **5 Claims**

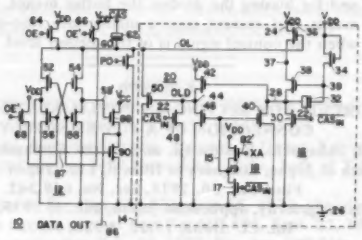


1. A fusable control system for use with a conductive probe level control device said probe having first and second electrically separated portions wherein the impedance of said probe is determined by the conductivity of a media in contact with said probe between said first and second portions, said system comprising, in combination:
- a transformer having a primary winding for coupling to a primary source of alternating current and a secondary winding for providing a source of alternating current operating potential, and wherein said operating potential is substantially less than the potential of said primary source;
- a fuse serially coupled with one of said windings and being operative to interrupt said source of operating potential when the current in said one of said windings exceeds a predetermined level;
- a relay having a coil and being responsive to alternating current to activate said relay, said relay having at least one set of contacts for controlling an external circuit;
- means for coupling one end of said relay coil and said secondary winding to a point of reference potential with respect to said operating potential;
- a unidirectional controlled rectifier having first and second main electrodes coupled between the other ends of said relay coil and said secondary winding, and said controlled rectifier having a control electrode for varying the impedance of said controlled rectifier between relatively conducting and non-conducting states;
- a diode coupled in parallel with said coil of said relay and poled in back-to-back relationship to said controlled rectifier; and,
- means for coupling said probe between said control electrode and said point of reference potential wherein said controlled rectifier becomes conductive when the impedance of said probe is less than a given level and a rectified, unidirectional altenating current is applied to said relay coil, whereby said diode is normally non-conductive and wherein said diode becomes conductive if said controlled rectifier becomes conductive in the opposite direction thereof whereby said current in said one of said windings exceeds said predetermined level.

4,019,068
LOW POWER OUTPUT DISABLE CIRCUIT FOR RANDOM ACCESS MEMORY

Alan Richard Bormann, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,457
Int. Cl.² H03K *19/08*, *19/34*, *3/353*; G11C *7/00*
U.S. Cl. 307—205 **3 Claims**



1. An electronic circuit comprising:
- a bootstrap inverting circuit including a switching MOSFET and a load MOSFET coupled in series, and a bootstrap capacitor charging MOSFET coupled to the gate of said load MOSFET;
- a series MOSFET coupled in series between a first voltage supply conductor and a drain of said load MOSFET;
- feedback circuit means coupled between an output of said bootstrap inverting circuit and a gate of said series MOSFET for controllably turning said series MOSFET off in response to a signal applied to a gate of said switching MOSFET to reduce power dissipation of said bootstrap inverter circuit; and
- said feedback means including inverting means responsive to said signal and having an input coupled to said output

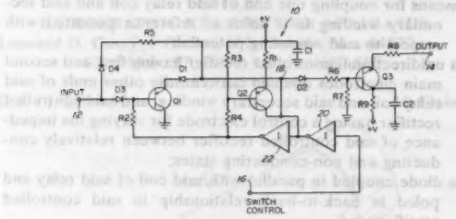
of said bootstrap inverting circuit and having an output coupled to said gate of said series MOSFET.

4,019,069

BASEBAND VIDEO SWITCH

Domenic A. Zambuto, Norwell, Mass., and Gordon Champion, Deep River, Conn., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 2, 1976, Ser. No. 673,023
Int. Cl.² H03K *17/74*
U.S. Cl. 307—256 **6 Claims**



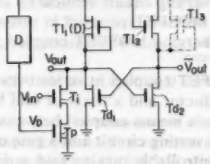
1. A baseband video switch including:
a. first and second oppositely poled diodes connected in series, the junction between the diodes forming a control point for the switch,
b. a third diode and a switchable, high impedance buffer means connected in series between an input terminal for the baseband video signal and the side of the first diode opposite to the control point.
c. a switchable driver means connected between the side of the second diode opposite to the control point and an output terminal for the baseband video signal,
d. a switchable, transistorized constant current source means for supplying a constant level of current to the control point where the diodes are in a conductive state, and
e. means responsive to a control signal having first and second voltage levels for biasing the diodes, and the buffer means, the driver means and current source means into conduction when the control signal is of the first level and for biasing the diodes, the buffer means, the driver means and current source means into non-conduction when the control signal is of the second level.

4,019,070

CIRCUIT FOR SETTING AN INITIAL STATE AFTER CONNECTION OF A POWER SUPPLY

Jiroh Sakaguchi, Kokubunji, and Hiroto Kawagoe, Kodaira, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 30, 1975, Ser. No. 645,342
Claims priority, application Japan, Jan. 6, 1975, 50-109
Int. Cl.² H03K *17/22, 3/286, 3/353*
U.S. Cl. 307—279 **10 Claims**



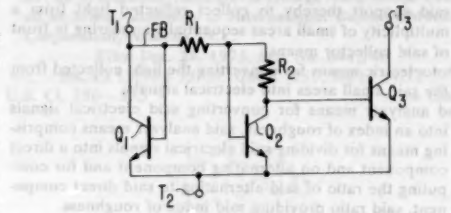
1. A circuit comprising:
a first terminal to which a power supply voltage is to be applied;
a second terminal to which a reference voltage is applied;
first and second inverter circuits connected between said first and second terminals and including a first transistor and a second transistor, respectively, the respective outputs of said first and second transistors being connected to the respective inputs of the second and first transistors, thereby forming a flip-forming a flip-flop circuit;
third and fourth transistors connected in series between the input of said second inverter circuit and said second terminal, and an input voltage being applied to said third transistor; and
a delay circuit, connected between said first terminal and the input of said fourth transistor, for preventing said fourth transistor from being rendered conductive until a preselected period of time after the application of said power supply voltage to said first terminal.

4,019,071

BIASING CURRENT ATTENUATOR

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,008
Int. Cl.² H03K *17/00*
U.S. Cl. 307—296 R **9 Claims**

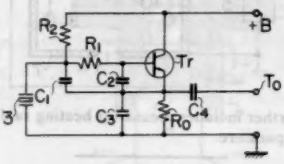


1. A biasing current attenuator comprising:
first, second and third terminals, said first and second terminals for accepting applied input current, said first and third terminals for suppling output current;
first, second and third transistors of the same conductivity type, each having base and emitter electrodes with a base-emitter junction therebetween and having a collector electrode, the emitter and collector electrodes of said first transistor being connected to said first and said second terminals, respectively, the collector electrode of said third transistor being connected to said third terminal;
a direct coupled collector-to-base feedback connection for said first transistor, whereby the emitter-to-base potential of said first transistor is regulated to condition said first transistor for conducting most of said input current between its collector and emitter electrodes;
a first resistive element connected to the base-emitter junction of said second transistor to form a serial combination therewith;
means for applying the base-emitter potential of said first transistor to said serial combination in a sense to forward-bias the base-emitter junction of said second transistor;
a second resistive element connected at one end to the base electrode of said second transistor and at the other end to the collector electrode of said second transistor and the base electrode of said third transistor; and
means connecting the emitter electrode of said third transistor to the emitter electrode of at least one of said first and said second transistors.

4,019,072
PIEZOELECTRIC PRESSURE SENSOR

Hideo Mifune, Hirakata; Kenroku Tani, Katano, and Tomohiko Niikawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 17, 1975, Ser. No. 558,627
Claims priority, application Japan, May 20, 1974, 49-57170
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.1 3 Claims



1. A piezoelectric pressure sensor for detecting the level of a liquid in a vessel, comprising:

an elongated tubular member having a closed end, an open end and a substantially hollow interior, a portion of said tubular member including said closed end extending into said vessel;

a piezoelectric transducer bonded to the interior surface of said closed end of said tubular member;

a cover member sealing the open end of said tubular member;

A.C. signal generating means electrically coupled through said cover member to said piezoelectric transducer for exciting said transducer to cause the closed end of said tubular member to vibrate;

detecting circuit means coupled to said transducer to detect changes in the impedance of said transducer as a function of changes in the environment in which said closed end of said tubular member is located between a substantially liquid and a substantially gaseous environment; and

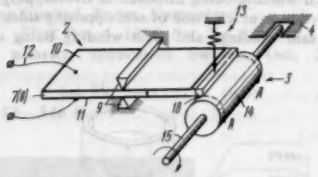
a temperature dependent impedance element located in said tubular member and electrically connected in series between said piezoelectric transducer and said A.C. signal generating means to prevent excitation of said transducer when the ambient temperature is below a predetermined value and to permit excitation of said transducer when the ambient temperature is above said predetermined value.

4,019,073
PIEZOELECTRIC MOTOR STRUCTURES

Vladimir Sergeevich Vishnevsky, ulitsa Ovruchskaya, 19, kv. 1; Vladimir Leonidovich Kavertsev, prospekt Voroshilova, 17a, kv. 24; Igor Alexandrovich Kartashev, pereulok Ivana Maryanenko, 7, kv. 22; Vyacheslav Vasilievich Lavrinenko, ulitsa A. Malyshko, 13, kv. 125; Mikhail Makarovich Nekrasov, prospekt Brest-Litovsky, 2, kv. 16a, and Alexei Alexeevich Prez, ulitsa Bolshaya Podvalnaya, 28, kv. 15, all of Kiev, U.S.S.R.

Filed Aug. 12, 1975, Ser. No. 604,064
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.2 61 Claims

1. An electric motor comprising a stator and a rotor; at least one of them including at least one vibrator having acoustically resonant elements incorporating a piezoelectric device; said piezoelectric device including electrodes having outgoing leads connected to an external voltage source, and means urging said stator and said rotor yieldably against each other at least at one point on the surface of said vibrator for transmission of the driving torque during one direction of oscillation

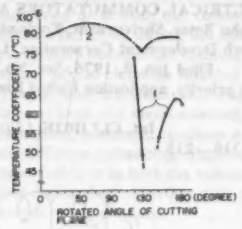


while providing space separation between the vibrator and the rotor during the other direction of oscillation.

4,019,074
$LiNbO_3$ SAW DEVICE

Kimio Shibayama, and Kazuhiko Yamanouchi, both of Sendai, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Oct. 1, 1975, Ser. No. 618,339
Claims priority, application Japan, Oct. 7, 1974, 49-114689
Int. Cl.² H01L *41/04*
U.S. Cl. 310—9.5 4 Claims



1. An electro-mechanical transducer comprising a $LiNbO_3$-piezoelectric substrate containing at least one impurity selected from the group consisting of Ta, Ta_2O_5, Pd, SiO_2, TiO_2, V_2O_5, V and a mixture of at least two of these impurities, and at least one electrode device for electro-mechanical conversion, provided on said $LiNbO_3$-piezoelectric substrate.

4,019,075
IRONLESS ROTOR WINDINGS OF ROTARY COILS IN MINIATURE ELECTRIC MACHINES

Isao Kagami, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 379,832, July 16, 1973, abandoned, which is a continuation of Ser. No. 182,696, Sept. 22, 1971.
This application Feb. 10, 1975, Ser. No. 548,760
Claims priority, application Japan, Sept. 26, 1970, 45-84455
Int. Cl.² H02K *23/30*
U.S. Cl. 310—206 5 Claims

1. In a miniature electric machine having an ironless rotor, the rotor comprising:

a. a rotary shaft;

b. a commutator fixed on said rotary shaft; and

c. a coil body,

said rotary shaft, commutator, and coil body being molded with a synthetic resin into an integral body,

said coil body being composed of a plurality of windings of individual conductors, each said winding being formed in a hexagonal shape,

the center axis of each of said plurality of individual hexagonal windings being disposed in parallel with the

axis of said rotary shaft so that a pair of opposing sides of said each individual hexagonal winding is parallel with said rotary shaft, one of said opposing sides of each winding being disposed in overlapping but offset relation to at least one of said opposing sides of another of said windings and each winding being of a radial

thickness no greater than the thickness of the conductor so that the thickness of said coil body is about twice the thickness of said individual winding, and the remaining four sides thereof being curved in conformity to the curvature of the cylindrical surface around the periphery of said rotary shaft.

4,019,076

ELECTRICAL COMMUTATORS AND SLIP-RINGS

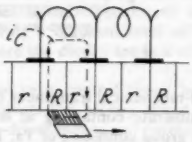
James John Bates, Shrivenham, England, assignor to National Research Development Corporation, London, England

Filed Jan. 8, 1975, Ser. No. 539,387

Claims priority, application United Kingdom, Jan. 11, 1974, 1328/74

Int. Cl.² H02K *13/04*

U.S. Cl. 310—233 **12 Claims**



1. An electrical machine including a commutator and electrical contact brushes bearing thereon, said commutator being movable with respect to the brushes and comprising a plurality of pairs of interconnected segments, said pairs being separated from one another by electrical insulation and individual segments of a pair having alternately low contact resistance and high contact resistance, said segments being positioned to enable the brush to contact the individual segments of a pair in sequence whereby the brush first contacts a low resistance segment and then a high resistance segment.

4,019,077

FIELD EMISSION ELECTRON GUN

Yoshio Sakitani, Ohimachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 19, 1975, Ser. No. 642,611

Claims priority, application Japan, Dec. 20, 1974, 49-145576

Int. Cl.² H01J *19/70*

U.S. Cl. 313—178 **13 Claims**

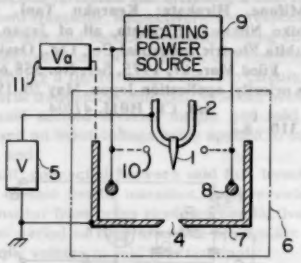
1. In a field emission electron gun including:

a cathode for emitting electrons,

an anode for attracting said electrons and toward which said electrons are accelerated, and

a high D.C. voltage source connected between said cathode and said anode,

the improvement wherein at least a portion of a surface of said anode upon which said electrons impinge is made of getter material, and



said gun further includes means for heating said anode at a high temperature.

4,019,078

METHOD OF ELECTRODE MOUNTING IN HIGH-PRESSURE SODIUM DISCHARGE LAMP

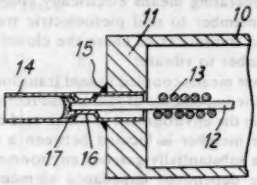
Norman Burgess, London, England, assignor to Thorn Electrical Industries Limited, London, England

Filed Oct. 29, 1975, Ser. No. 626,655

Claims priority, application United Kingdom, Oct. 30, 1974, 47037/74

Int. Cl.² H01J *61/06*

U.S. Cl. 313—217 **6 Claims**



1. In a high-pressure sodium discharge lamp having a discharge envelope comprising a ceramic tube with ceramic end discs and having at each end of the envelope an electrode supported by a metal tube which is sealed to the end disc, the improvement which comprises for each electrode a stem carrying said electrode, said tube having an inner portion through which said stem extends with clearance and having a portion outside of but close to the end disc, which outer portion is pressed into engagement with and sealed to the said stem.

4,019,079

GAS INJECTED VACUUM SWITCH

K. Dan Hardin, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 7, 1976, Ser. No. 684,420

Int. Cl.² H01J *17/26, 19/68, 21/00*

U.S. Cl. 313—231.4 **6 Claims**

1. A gas injected vacuum switch comprising;

a housing having a generally cylindrical interior chamber;

first conduit means operably connected to said chamber for evacuating said chamber;

an anode disposed within said chamber;

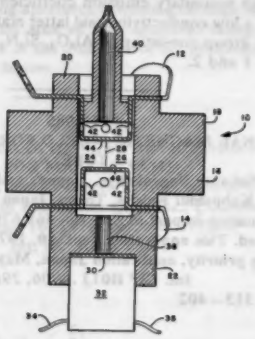
a cathode, spaced from said anode, disposed within said chamber;

second conduit means for providing a passageway into said chamber;

means for sealing said chamber from said second conduit means; and

means for producing electrically conductive gaseous mate-

rial, for breaching said seal, and for injecting said material through said second conduit means into said chamber to



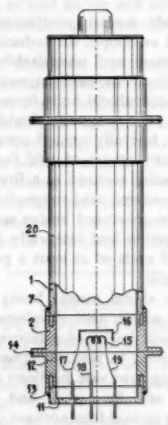
provide a conductive path for electric current between said anode and said cathode.

4,019,080

VACUUM-TIGHT SEALS BETWEEN CERAMIC AND ALUMINIUM COMPONENTS, EVACUATED ENVELOPES INCORPORATING THE COMPONENTS SEALED BY SAID METHOD, AND VACUUM TUBES INCORPORATING SAID ENVELOPES

Andre Besson, Paris, France, assignor to Thomson-CSF, Paris, France

Division of Ser. No. 302,416, Oct. 31, 1972, Pat. No. 3,893,224. This application Apr. 29, 1974, Ser. No. 465,189
Claims priority, application France, Nov. 5, 1971, 71.39796
Int. Cl.² H01J 5/00
U.S. Cl. 313—317 2 Claims



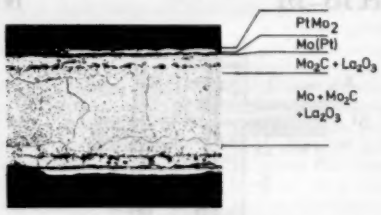
1. An evacuated envelope, comprising at least one ceramic component and one aluminium component, sealed to one another along a common interface, a metallized layer on said ceramic component along said interface, and a fused solder having a Al-Si eutectic structure with 89% aluminium and 11% silicon along said interface.

4,019,081

REACTION CATHODE

Charley Buxbaum, Baden, and Gernot Gessinger, Bublikon, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 6, 1975, Ser. No. 620,175
Claims priority, application Sweden, Oct. 25, 1974, 7414295
Int. Cl.² H01J 1/14, 19/06
U.S. Cl. 313—346 R 10 Claims



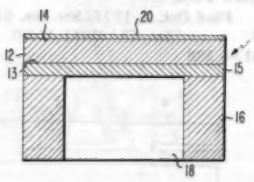
1. In a reaction cathode with high thermic emission, which is especially suited for vacuum tube application, and which comprises a carrier body consisting of crystallite grains and a compound of a monolayer-forming element, which compound is liberated by a continuous supply reaction and transported to the emitting surface of the cathode by diffusion through the volume, the grain boundaries or in both the volume and the grain boundaries of said carrier body during the operation of the cathode, the improvement wherein the monolayer-forming element is at least one of the elements selected from the group consisting of yttrium and lathanum and wherein said cathode further contains at least one metal selected from the group consisting of palladium, platinum, rhodium and ruthenium, as a solid state diffusion-enhancing dispersed in the volume, in the grain boundaries or in both the volume and the grain boundaries of said carrier body together with said compound of the monolayer-forming element.

4,019,082

ELECTRON EMITTING DEVICE AND METHOD OF MAKING THE SAME

Gregory Hammond Olsen, Cranbury; Ramon Ubaldo Martinelli, Hightstown, and Michael Ettenberg, Freehold, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,353
Int. Cl.² H01J 1/14, 19/06
U.S. Cl. 313—346 R 11 Claims

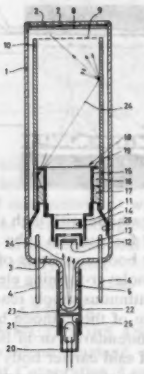


1. An electron emitting device comprising
a first body of single crystalline gallium arsenide having opposed, substantially flat surfaces,
a second body of single crystalline indium gallium phosphide on one of the surfaces of said first body, said second body being thinner than said first body, and
a layer of an electropositive work function reducing material on the other of said surfaces of said first body.

4,019,083
TELEVISION CAMERA TUBE

Nicolaas Hendrik Limper, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,254
Claims priority, application Netherlands, Sept. 19, 1974, 7412382
The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.
Int. Cl.² H01J *31/26, 31/38*
U.S. Cl. 313—372 10 Claims

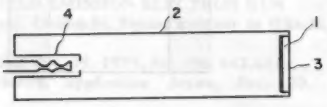


1. A television camera tube having, in an evacuated envelope, a photosensitive target, an electron gun assembly, an anode sleeve extending between the target and the gun assembly, and means for the auxiliary illumination of the target, said auxiliary illuminating means comprising a light source, a hollow light shielding cylinder located within said anode sleeve to define an annular space between its outer wall and an inner wall portion of said sleeve, an annular light distributor disposed within said annular space, said shielding cylinder coaxially extending within said anode sleeve in a direction toward said target a distance which produces a substantially uniform illumination of said target and a television signal is obtained which is uniform within narrow limits across said target, and means for conducting light from said light source to the distributor in the annular space section remote from said target.

4,019,084
PYROELECTRIC VIDICON HAVING A PROTECTIVE COVERING ON THE PYROELECTRIC TARGET

Thomas H. Conklin, Ridgefield, Conn., and Barry M. Singer, New York, N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,768
Int. Cl.² H01J *31/00*
U.S. Cl. 313—388 2 Claims

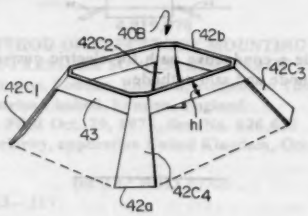


1. In a pyroelectric vidicon including an evacuated envelope having a pyroelectric target at one end and an electron gun at the other end for scanning a surface of the target, said target consisting of a material which is unstable in a vacuum and decomposes upon heating and selected from the group consisting of tri-glycine sulfate, tri-glycine fluoberylliate and alanine tri-glycine sulfate, the improvement wherein the surface of said target exposed to the vacuum is covered with a protective coating of a vacuum compatible material having a relatively high secondary emission coefficient, a low first crossover and a low conductivity, said latter material being selected from the group consisting of Al_2O_3, Si_3N_4 and $Si\ O_x$, x being between 1 and 2.

4,019,085
INTERNAL MAGNETIC SHIELD FOR CATHODE RAY TUBE

Shigeki Sakata, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 465,670, April 30, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,872
Claims priority, application Japan, May 2, 1973, 48-52556
Int. Cl.² H01J *29/06, 29/07*
U.S. Cl. 313—402 5 Claims



1. A color cathode ray tube for use in a color television receiver and comprising:

a. an enclosed envelope including a face plate, a funnel portion and a neck portion, said face plate being of a substantially rectangular shape including four sides and four corners;

b. a phosphor screen disposed on the internal surface of said plate and including blue, green and red phosphors;

c. electron gun means disposed within said neck portion of said envelope to generate a beam of electrons toward said screen;

d. shadow mask means, disposed in said envelope opposite to said phosphor screen, for determining the landing positions of said beam of electrons on said phosphor screen;

e. magnetic shield means, positioned within the funnel portion of said envelope, for reducing the effects of terrestrial magnetism and undesirable magnetic fields on said beam of electrons, said magnetic shield means comprising a magnetic shield body formed of sheet magnetic metal material, said magnetic shield body including four non-apertured, laterally spaced corner walls corresponding to said four corners of said faceplate, each of said corner walls being secured at a first end thereof to said shadow mask means, said magnetic shield body further comprising non-apertured bridge sections located within said funnel portion and integrally joined with and connecting second ends of at least a portion of adjacent of said corner walls;

f. said magnetic shield means being positioned within a funnel region within said envelope surrounding a path along which said beam of electrons from said electron gun means travels to said phosphor screen, said funnel region including four side portions corresponding to said four sides of said face plate and four corner portions corresponding to said four corners of said face plate, said funnel region extending from a first end thereof adjacent said shadow mask means to a second end thereof spaced from said shadow mask means, said four corner walls of said magnetic shield body being positioned within said four side portions of said funnel region, said bridge sections of said magnetic shield body being positioned within said side positions of said funnel region;

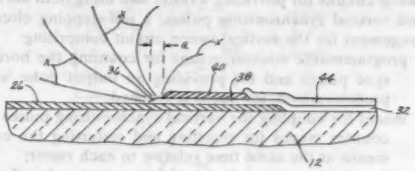
g. the peripheral area of said funnel region between said corner walls and not occupied by said magnetic shield body comprising apertures extending through said funnel region, the total area of said apertures being equal to from 20 to 70% of the total area of the peripheral surface of said funnel region.

4,019,086

ELECTRICAL INDICIA DISPLAY DEVICE AND METHOD FOR MAKING SAME

Herman R. Person, and Lawrence E. Gilg, both of Columbus, Nebr., assignors to Dale Electronics, Inc., Columbus, Nebr.

Filed Sept. 16, 1975, Ser. No. 613,815
Int. Cl.² H01J *61/00*
U.S. Cl. 313—518 **10 Claims**



1. A method for making an indicia display device comprising:

printing a plurality of electrical conductors and at least one anode on the upper surface of a dielectric substrate,

printing a first dielectric layer over said conductors and anode, said first dielectric layer having an anode opening therein;

positioning said first dielectric layer during printing thereof so that said anode opening exposes a first portion of said anode, and the marginal edges of said anode opening overlie a second portion of said anode,

printing a plurality of cathode segments over said first dielectric layer adjacent said marginal edges of said anode opening so that said cathode segments are overlying said second portion of said anode and said dielectric material separates and insulates said cathode segments from said anode;

printing a second dielectric layer over said cathode segments, said second dielectric layer having an indicia opening registered with said cathodes and exposing said cathodes adjacent said marginal edges of said anode opening in said first dielectric layer;

sealing said upper surface of said substrate in a compartment having a viewing window therein;

introducing an ionizable gas capable of cathode glow into said compartment and into communication with said exposed portions of said cathode segments.

4,019,087

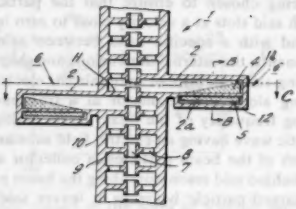
COUPLED-CAVITY TYPE TRAVELING-WAVE TUBE WITH SEVER TERMINATION ATTENUATORS

Sadanori Hamada; Kunio Tsutaki, and Hiroyuki Hashimoto, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Mar. 16, 1976, Ser. No. 667,464
Claims priority, application Japan, Mar. 20, 1975, 50-34692
Int. Cl.² H01J *25/34*
U.S. Cl. 315—3.5 **6 Claims**

1. In a traveling-wave tube equipped with a coupled-cavity type slow-wave circuit having a housing for vacuum sealing the slow-wave structure, comprising a vacuum sealed waveguide extending outwardly from said housing and having its interior communicating with the interior of said slow-wave structure housing, sever termination means having an attenuator body which is essentially comprised of a ceramic material containing an electromagnetic energy absorbing substance and is brazed to the inner surface of one wall of said waveguide and which is electromagnetically coupled to the slow-wave circuit element;

said coupled-cavity type traveling-wave tube being characterized in that the waveguide wall where the attenuator



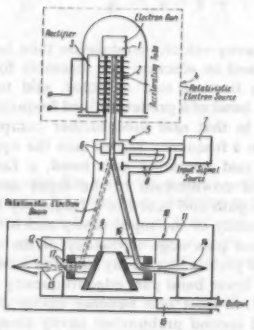
body of the sever terminations means is brazed is made sufficiently thin to allow the waveguide wall to be readily plastically deformed as the ceramic material attenuator body is thermally deformed, a ceramic plate for balancing thermal stress is brazed to the outer side of the thin waveguide wall opposite that of the attenuator body, and the ceramic plate is hermetically enclosed within an outer structure joined to said waveguide and enclosing said thin waveguide wall and said ceramic plate which maintains a vacuum condition within its interior.

4,019,088

ELECTROVACUUM SHF APPARATUS

Gersh Itskovich Budker, ulitsa Maltseva, 6; Sergei Nikolaevich Morozov, ulitsa Tereshkovoi, 42, kv. 3; Oleg Alexandrovich Nezhevenko, ulitsa Tereshkovoi, 7, kv. 1; Gennady Nikolaevich Ostreiko, Morskoi prospekt, 60, kv. 24, and Isai Abramovich Shekhtman, ulitsa Ilicha, 15, kv. 68, all of Novosibirsk, U.S.S.R.

Filed Apr. 8, 1975, Ser. No. 566,049
Int. Cl.² H01J *25/22*
U.S. Cl. 315—5.24 **5 Claims**



1. A vacuum SHF apparatus comprising: means for forming a charged-particle beam to be directed along the longitudinal axis of the apparatus; an accelerating tube arranged at the output of said beam forming means, for imparting a velocity close to that of light to the charged particles of the beam; a first deflection yoke for circular scanning of the beam at an input signal frequency, said first yoke being arranged behind said tube, along the beam path, and coaxially with said beam forming means; an additional magnetic deflection yoke ar-

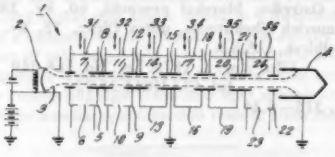
ranged successively along the beam path behind said first yoke and coaxially therewith, for deflecting the scanned beam outwardly from the longitudinal axis; a hollow annular resonator arranged successively behind said additional yoke and coaxially therewith along the beam path; said resonator having broader walls that are parallel with the longitudinal axis; annular slots being provided in said resonator walls for the beam, that has been deflected by said additional yoke, to pass through said slots; circular windings through which current flows from said additional yoke, positioned in planes perpendicular to the longitudinal axis, the radius pitch of said windings being chosen to ensure that the particle beam passes through said slots at a velocity close to zero in the axial direction and with a specific ratio between azimuth and radial components; the internal dimensions and shape of said resonator being such that it can maintain an electromagnetic wave traveling along said resonator at a frequency equal to the standing frequency of the beam or its multiple, the electromagnetic wave having an electric field substantially parallel to the path of the beam particles; a collector arranged successively behind said resonator, along the beam path for receiving the charged-particle beam as it leaves said resonator; and means for deriving SHF power from said resonator.

4,019,089

WIDEBAND MULTI-CAVITY VELOCITY MODULATION TUBE

Takao Kageyama, and Hiroshi Kato, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Mar. 23, 1976, Ser. No. 669,648
Claims priority, application Japan, Apr. 3, 1975, 50-40627
Int. Cl.² H01J *25/10*
U.S. Cl. 315—5.43 **6 Claims**



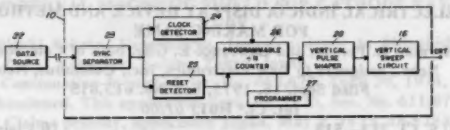
1. A multi-cavity velocity modulation tube having a collector electrode and an electron gun assembly for directing an electron beam towards said collector, said tube having an operating pass band of a predetermined frequency bandwidth, characterized in that said tube further comprises an input cavity tuned to a frequency higher than the upper band edge frequency of said operating pass band, a first prebuncher cavity disposed downstream of the input cavity along the electron beam path and tuned to a frequency lower than the resonant frequency of the input cavity and in the vicinity of said upper band pass edge frequency of the operating pass band, a second prebuncher cavity tuned to a frequency in the vicinity of the lower band pass edge frequency of said operating pass band, at least one buncher cavity disposed downstream of said second prebuncher cavity along the electron beam path and tuned to a frequency higher than the resonant frequency of said input cavity, an output cavity disposed downstream of said buncher cavity along the electron beam path and tuned to a frequency within said operating pass band for extracting output wave energy from a density-modulated electron beam, and drift tubes intervening between every adjacent pair of said cavities; the Q-value of said input cavity being lower than the Q-value of the first prebuncher cavity; and the second prebuncher cavity and all the buncher cavities are unloaded.

4,019,090

SELF-STEPPING VERTICAL SCAN SYSTEM

David Allen Wolff, Schaumburg, and Walter Kowalski, Franklin Park, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 5, 1975, Ser. No. 638,123
Int. Cl.² H01J *29/70*
U.S. Cl. 315—8.5 **10 Claims**



1. In a CRT display device having horizontal and vertical sweep circuits for providing a raster and using both horizontal and vertical synchronizing pulses, a self-stepping circuit arrangement for the vertical sweep circuit comprising:

programmable counter means for counting the horizontal sync pulses and for providing an output pulse when a predetermined, set count is reached;

means for coupling the vertical synchronizing pulses to the counter means for resetting and restarting the counter means at the same time relative to each raster;

pulse shaping means for receiving output pulses from the counter means and providing stepped vertical sweep signals to the vertical sweep output circuit; and

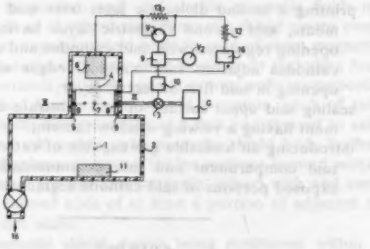
means for controlling the pulse shaping means for adjusting the raster height.

4,019,091

GAS DISCHARGE ELECTRON GUN FOR GENERATING AN ELECTRON BEAM BY MEANS OF A GLOW DISCHARGE

Theodorus Maria Berendina Schoenmakers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 575,490, May 8, 1975, abandoned.
This application Apr. 9, 1976, Ser. No. 675,498
Claims priority, application Netherlands, May 30, 1974, 7407253
Int. Cl.² B23K *15/00*; H01J *17/26*
U.S. Cl. 315—111.8 **5 Claims**



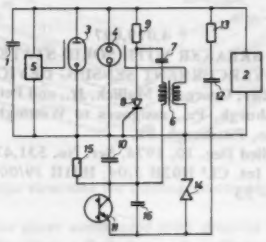
1. A gas discharge electron gun for generating an electron beam by means of a glow discharge, comprising an envelope and, within said envelope, and electrode assbley including a cathode and at least one tubular positive electrode, means for supplying a gaseous ionizable medium into said envelope to produce the glow discharge within said electrode assembly when a voltage is applied thereto, means for measuring voltage on the electrode assembly and means for measuring pressure of the gaseous medium during the discharge, flow control means provided in said medium supplying means and coupled to said pressure measuring means and to said voltage measuring means to control the flow of the gaseous medium in re-

sponse to predetermined voltage variations, the tubular electrode in said assembly including an inner duct which communicates with said supplying means and has at least one aperture interconnecting said duct with the space where the glow discharge takes place.

4,019,092
PHOTOGRAPHIC FLASH APPARATUS

Armin Stiller, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Apr. 18, 1975, Ser. No. 569,582
Claims priority, application Germany, May 15, 1974, 2423527
Int. Cl.² H05B *41/32, 37/02, 37/00*
U.S. Cl. 315—159 **4 Claims**



1. Photographic flash apparatus having an electronic flash tube, means for initiating a flash in said tube, means for terminating a flash in progress in said tube, and exposure-measuring and flash-terminating circuitry for operating said flash terminating means, said circuitry including a light-sensitive element and an integrating capacitor having terminals connected together so said light-sensitive element and said integrating capacitor are in series with each other, a voltage source for said exposure-measuring and flash-terminating circuitry, said voltage source including means for supplying a higher voltage point and a lower voltage point for energizing said exposure-measuring and flash-terminating circuitry, and a thyristor having an anode, a cathode, and a control electrode, said thyristor being effective when conductive to cause said terminating means to terminate a flash, said flash apparatus being characterized by the facts that:

a. a terminal of said integrating capacitor opposite from said terminal connected to said light-sensitive element is connected directly to said higher voltage point;
b. a terminal of said light-sensitive element opposite from said terminal connected to said integrating capacitor is connected directly to said lower voltage point;
c. the control electrode to cathode path of said thyristor is connected in parallel with said integrating capacitor;
d. a resistor is connected in parallel with said integrating capacitor and arranged for discharging said integrating capacitor after each flash and
e. means connected between said higher and lower voltage points for maintaining the constancy of the voltage between said points.

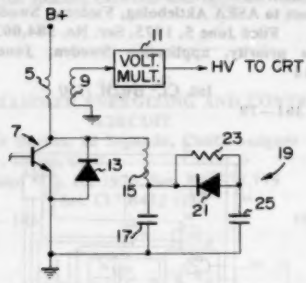
4,019,093
HORIZONTAL DYNAMIC DAMPER CIRCUITRY

Arthur H. Klein, Oakfield, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Oct. 9, 1975, Ser. No. 620,869
Int. Cl.² H01J *29/56*
U.S. Cl. 315—370 **6 Claims**

1. In color cathode ray tube display apparatus having a horizontal deflection system, a dynamic damper circuit comprising:

a potential source;
a horizontal deflection signal source;
a horizontal deflection yoke winding coupled to said potential source and horizontal deflection signal source;
"S" curve correction means series connected to said horizontal deflection yoke winding, said series connected horizontal deflection yoke winding and "S" curve correction means shunting said horizontal deflection signal source; and

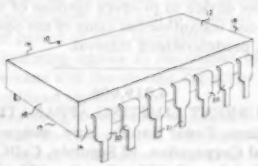


dynamic damper means in the form of a series connected charge storage means and a diode shunted by an impedance shunt connected across said "S" curve correction means with said impedance providing a charge path and said diode providing a discharge path for said charge storage means form said potential source whereby undesired ringing signals in the horizontal deflection system due to large intermittent video signal changes are damped.

4,019,094
STATIC CONTROL SHORTING CLIP FOR SEMICONDUCTOR PACKAGE

Edward H. Dinger; David G. Saben, and John R. VanPatten, all of Waynesboro, Va., assignors to General Electric Company, Salem, Va.

Filed Dec. 19, 1975, Ser. No. 642,349
Int. Cl.² H05F *3/02*
U.S. Cl. 361—220 **12 Claims**



1. A shorting clip for use with a semiconductor package including a substantially flat body defining top, bottom, side and end surfaces and including at least one electrical lead extending from each side surface at an angle with respect to the planes of said top and bottom surfaces, said clip comprising:

a. a top portion dimensioned to overlay the top surface of said body;
b. a pair of electrically interconnected leg portions attached to said top portion and adapted to resiliently engage and electrically contact, respectively, the electrical leads extending from said side surfaces;
c. a retaining member resiliently secured to each end of said top portion, each of said retaining members extending across a respective end surface of said body and adapted for engagement with said bottom surface; and,
d. resilient means intermediate said top portion and said top surface to bias said portion and said body apart and

thereby enhance engagement of said retaining members with said bottom surface.

4,019,095

CAPACITOR EQUIPMENT

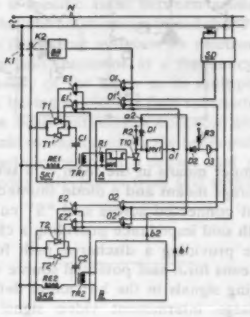
Harry Frank, and Kjell Rehnman, both of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed June 5, 1975, Ser. No. 584,003

Claims priority, application Sweden, June 25, 1974, 74083114

Int. Cl.² H02H 7/20

U.S. Cl. 361—79 **6 Claims**



1. Shunt capacitor equipment which comprises a series-connection, connected to an alternating voltage network, of

a. two antiparallel-connected thyristors,

b. one capacitor,

c. one reactor,

in which a control device is connected to the control electrodes of the thyristors and arranged alternately to ignite the thyristors at times in the vicinity of th peak value of the alternating voltage, the improvement which comprises a sensing member for sensing an operating magnitude in said series-connection and a level-sensing member connected to the sensing member and to the control device including means to influence the control device to produce ignition of both thyristors in response to one instantaneous value of the operating magnitude outside a predetermined interval.

4,019,096

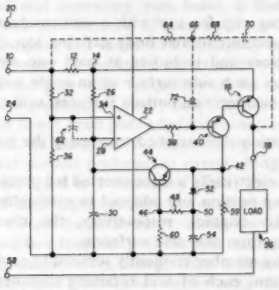
CURRENT LIMITING APPARATUS

Johannes Bullinga, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 7, 1976, Ser. No. 693,452

Int. Cl.² H02H 3/08

U.S. Cl. 361—86 **4 Claims**



2. Apparatus for minimizing power dissipation in series circuit current limiting means comprising, in combination:

means for detecting current flow magnitude to a load;

means, connected to said means for detecting, for interrupting current flow to the load upon detection of a current flow magnitude greater than a predetermined amount;

means, connected to said detecting and interrupting means for maintaining the interrupted condition for a relatively long time compared to the current flow connected time during short circuited load conditions; and

means, connected to said means for interrupting current flow, for lengthening the time necessary to change between the interrupted and connected current flow conditions.

4,019,097

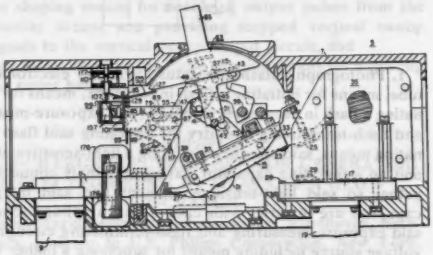
CIRCUIT BREAKER WITH SOLID STATE PASSIVE OVERCURRENT SENSING DEVICE

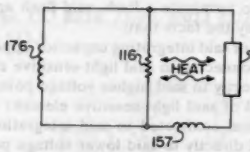
Robert C. Miller; George T. Mallick, Jr., and Peter R. Emtage, all of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1974, Ser. No. 531,428

Int. Cl.² H02H 5/04; H01H 39/00

U.S. Cl. 361—93 **11 Claims**





1. A circuit breaker, comprising:

separable contacts;

a flux transfer trip mechanism comprising a permanent magnet, two magnetic circuits, and a trip coil, said trip coil being operable upon energization to switch magnetic flux produced by said permanent magnet from one of said magnetic circuits to the other to actuate said flux transfer trip mechanism and effect separation of said contacts;

an overcurrent sensing device comprising a temperature-dependent switching resistor connected to said trip coil and switchable between first and second resistance levels, said resistor operable upon switching to said second resistance level to energize said trip coil and actuate said flux transfer trip mechanism; and

current coupling means connected to said contacts, said trip coil, and said temperature dependent switching resistor;

an overcurrent condition through said contacts causing said temperature-dependent switching resistor to switch to said second resistance level and actuate said flux transfer trip mechanism, thereby affecting separation of said contacts.

4,019,098

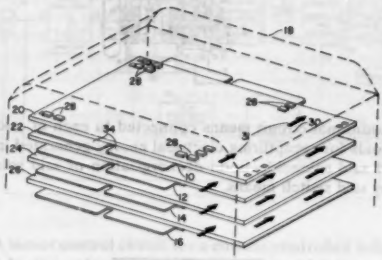
HEAT PIPE COOLING SYSTEM FOR ELECTRONIC DEVICES

Raymond George McCready, South Bend, Ind., and Philip Eugene Eggers, Worthington, Ohio, assignors to Sundstrand Corporation, Rockford, Ill.

Division of Ser. No. 526,643, Nov. 25, 1974. This application June 6, 1975, Ser. No. 584,313

Int. Cl.² H05K 7/20

U.S. Cl. 361—385 11 Claims



1. A heat pipe structure for cooling electronic components comprising:

a first planar sheet configured with grooves on the inner surface that form a first group of capillary channels;

a second planar sheet configured with grooves on the inner surface that form a second group of capillary tubes;

at least three spacer members interposed between said first and said second sheet effective to form at least two vapor channels parallel to each of said groups of capillary channels;

a condenser region at one end of the heat pipe for transferring heat from the heat pipe to a cooling medium;

a working fluid contained in a liquid state in said capillary channels and a vapor state in said vapor channels for transferring heat from the electronic components to said condenser region;

a plurality of electronic components secured to the outer surface of said first sheet;

a circuit board secured to the outer surface of said second sheet;

a plurality of terminal pins extending through the heat pipe connecting said electronic components to said circuit board.

4,019,099

CIRCUIT BOARD MOUNTING DEVICE

Anthony D. Calabro, 8738 West Chester Pike, Upper Darby, Pa. 19082

Filed Jan. 15, 1976, Ser. No. 649,453

Int. Cl.² H02B 1/02

U.S. Cl. 361—399 12 Claims

1. A track mounting device for slidably receiving and frictionally holding a circuit board comprising an elongated channel member of generally U-shaped cross-section including two parallel side walls and an intermediate slide bearing base portion, opposed resilient grip means projecting from said side walls intermediate the length thereof to form a laterally expansible track in frictional contact with the circuit board supported on the slide bearing base, said side walls including opposed thickened portions projecting into the space between the parallel side walls intermediate the length thereof, and opposed protrusions disposed at opposite ends of the side walls and projecting into the space between said side walls, with the spacing between said opposed protrusions being less than the spacing between said opposed thickened portions but greater than the spacing between said opposed resilient grip means.

4,019,100

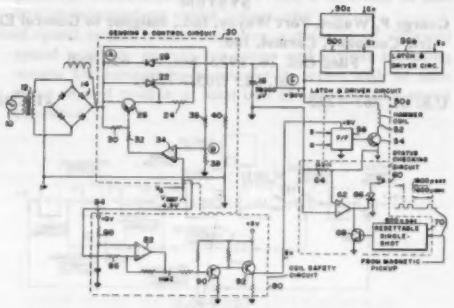
PRINT HAMMER ENERGIZING AND CONTROL CIRCUIT

Gordon Brent Barrus, El Segundo, Calif., assignor to Printronix, Inc., Irvine, Calif.

Filed May 16, 1975, Ser. No. 578,179

Int. Cl.² B41J 9/38

U.S. Cl. 361—186 10 Claims



1. An arrangement for energizing a plurality of print element circuits in a printer system comprising:

an AC source;

full wave rectifier means coupled to the AC source;

storage capacitor means coupled to energize a plurality of print element circuits;

gating means coupling the full wave rectifier means to the storage capacitor means, said gating means being operative to conduct when fired and to continue conducting for a selected period of time thereafter;

means for summing signals at the output of the full wave rectifier means and the storage capacitor means to provide a combined signal;

means for providing a reference signal; and

means coupled to compare the combined signal and the reference signal, the means coupled to compare being operative to fire the gating means each time the combined signal and the reference signal assume a predetermined relationship.

4,019,101

CORROSION-RESISTANT REGENERABLE ELECTRICAL CAPACITOR

Karl-Heinz Preissinger, Taufkirchen; Walter Voelkl; Willi Weber, both of Munich, and Ulrich Wehnelt, Starnberg, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 26, 1975, Ser. No. 590,719

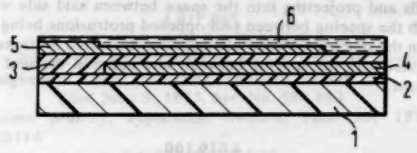
Claims priority, application Germany, June 27, 1974, 2431013

Int. Cl.² H01G 4/24

U.S. Cl. 361—313 4 Claims

1. A corrosion-resistant regenerable electrical capacitor comprising: a first metallized electrode hermetically connected to and sandwiched between two solid plastic dielectric layers, one of said dielectric layers being of weak regenerating characteristics, one of said dielectrics in contact with a carrier

foil, the other dielectric having a second metallized electrode in capacitive relationship to said first metallized electrode, a



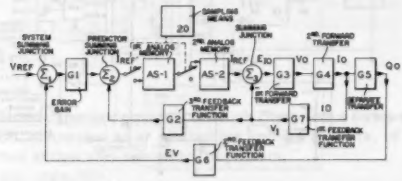
major surface of said second metallized electrode being free of solid plastic and being coated with a liquid insulating oil.

4,019,102

SUCCESSIVE APPROXIMATION FEEDBACK CONTROL SYSTEM

George P. Wallot, Fort Wayne, Ind., assignor to General Electric Company, Carmel, Ind.

Filed Oct. 16, 1975, Ser. No. 622,960
Int. Cl.² G03G 13/02
U.S. Cl. 361—225 **21 Claims**



1. A feedback control system comprising:

a first feedback loop including an input reference, a summing junction, a forward transfer function, an output yielding a controlled variable, and a first feedback transfer function for sampling the controlled variable and feeding an output signal proportional to the controlled variable to the summing junction;

a separate transfer function having an input connected to the output of the first feedback loop and producing a system output controlled variable;

a system input reference having as a value the ideal for the system output controlled variable;

a predictor means for sampling the system output controlled variable, the system input reference, and the first feedback loop controlled variable to produce a corrected input reference for the first feedback loop to result in a shift in the first feedback loop output and a corresponding shift in system output controlled variable that will by successive approximation approach a value which is in correct proportion to the system input reference thereby resulting in a near zero system error.

4,019,103

ELECTROMAGNETIC MOTOR AND GENERATOR

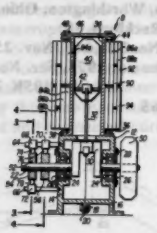
Oliver Thurston Davis; Norman Ray Jones, both of Rte. 1, P.O. Box 33, Dunlap, Tenn. 37327, and Elmer Carl Eddy, Rte. 1, P.O. Box 258, Whitwell, Tenn. 37397

Filed Mar. 5, 1976, Ser. No. 664,089
Int. Cl.² H02K 33/12
U.S. Cl. 318—37 **11 Claims**

1. A motor-generator comprising:

a. a cylinder having a pair of solenoid means disposed one around each end thereof and a magnetizable piston reciprocally mounted in said cylinder, said piston being swingably connected by link means to a rotatably mounted crankshaft means;

b. switch means operatively connected to said crankshaft means and interposed in an electric circuit for selectively energizing said solenoids to cause rotary motion of said crankshaft means; and



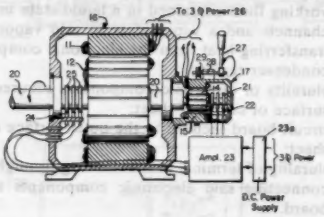
c. additional circuit means connected to each of said solenoids for recapturing electrical energy generated in each of said solenoids, upon deenergization of said solenoids by said switch means.

4,019,104

VARIABLE SPEED INDUCTION MOTOR

Louis W. Parker, 2408 Sunrise Key Highway, Fort Lauderdale, Fla. 33304

Continuation-in-part of Ser. No. 454,991, March 26, 1974, abandoned. This application May 12, 1975, Ser. No. 576,934
Int. Cl.² H02P 7/36; H02K 17/24
U.S. Cl. 318—195 **22 Claims**

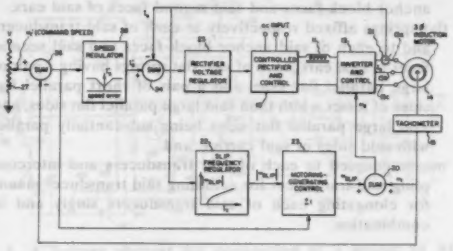


1. A motor system comprising a polyphase induction motor having a first wound stator and a first wound rotor mounted on a rotatable shaft for rotation adjacent said first stator, a polyphase generator having the same number of poles as said motor, said generator comprising a second wound stator and a second wound rotor mounted for rotation adjacent said second stator, the horsepower rating of said generator being less than that of said motor, means mechanically coupling said second rotor to said rotatable shaft to cause rotation of said first rotor to rotate said second rotor at the same rotational speed, a polyphase power source connected in parallel to both of said wound stators for energizing said stators in phase with one another with sinewave shaped voltages of like magnitude, a polyphase linear amplifier, rectifier power supply means disposed between said polyphase power source and said amplifier for energizing said amplifier with substantially D.C. power, said amplifier having its inputs connected to the windings of said second rotor, the outputs of said linear amplifier being connected to the windings of said first rotor whereby the polyphase sinewave shaped output voltages generated across the windings of said second rotor are amplified by said linear amplifier and supplied as amplified sinewave shaped voltages respectively to the windings of said first rotor to control the current flow in the windings of said first rotor.

4,019,105
CONTROLLED CURRENT INDUCTION MOTOR DRIVE

Edward P. Cornell, and Thomas A. Lipo, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 26, 1975, Ser. No. 617,187
Int. Cl.² H02R 5/40
U.S. Cl. 318—227 11 Claims



1. A motor control circuit for a current controlled induction motor having a stator winding on a stator which is separated from a rotor by an air gap comprising

a constant current source converter for producing variable amplitude and frequency stator line current to be supplied to the stator winding,

current sensing means for sensing the peak stator current amplitude and speed sensing means for effectively sensing the speed and frequency of said rotor and generating sensor signals respectively representative thereof,

first feedback control means for deriving a slip frequency signal as a predetermined function of said stator current sensor signal to maintain constant rated air gap magnetic flux,

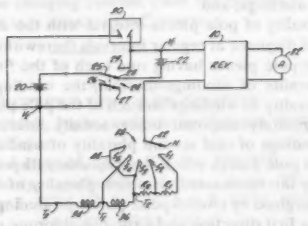
second feedback control means for summing said slip frequency and rotor frequency sensor signals to generate an electrical frequency control signal which is fed to said converter to determine the frequency of the stator line current produced by said converter, and

third feedback control means for summing a stator current amplitude command signal representative of desired torque and said stator current sensor signal to generate an error signal which is fed to said converter to determine the amplitude of the stator line current produced by said converter.

4,019,106
MOTOR SPEED CONTROL

Robert L. Van Doren, Garden Grove, Calif., assignor to Taylor-Dunn Manufacturing Company, Anaheim, Calif.

Filed Mar. 18, 1974, Ser. No. 452,384
Int. Cl.² H02P 7/00
U.S. Cl. 318—252 7 Claims



1. A speed control for a motor having a plurality of series wound field coils comprising

a variable voltage source,

voltage switch means movable between first and second positions for connecting said source to said coils to provide lower voltage in said first position of said voltage switch means and higher voltage in said second position of said voltage switch means,

speed switch means including a speed switch arm sequentially movable to positions of low, intermediate and high speed ranges, said speed switch means includng means operable in said intermediate range for disabling one of said coils while maintaining energization of another of said coils,

said speed switch means also including means operable in said low and high range for maintaining energization of at least said one coil,

means for causing said voltage switch means to move from said first position to said second position substantially together with movement of said speed switch arm to said high range from said intermediate range,

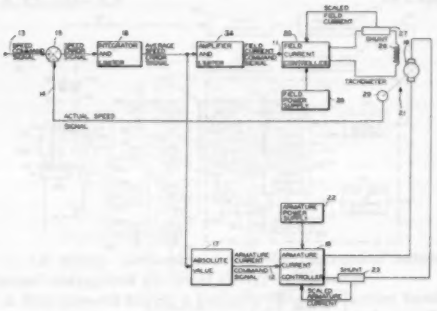
means for retaining said voltage switch means in said first position whenever said speed switch is in either of said low or intermediate speed ranges, and

said speed switch means including a plurality of different speed positions in said low range and further including means for connecting resistance in series with at least some of said coils in at least one of said different speed positions.

4,019,107
D. C. MOTOR CONTROL SYSTEM

George Scott Dixon; Edward O. Gilbert; Theodore A. Oliver, all of Ann Arbor, Mich., and James W. A. Wilson, Willoughby, Ohio, assignors to Reliance Electric Company, Euclid, Ohio

Filed Feb. 3, 1975, Ser. No. 546,201
Int. Cl.² H02P 7/14
U.S. Cl. 318—338 14 Claims



1. A control circuit for a direct current shunt field electric motor having a field current controller and an armature current controller, comprising:

a source of a speed command signal for said motor;

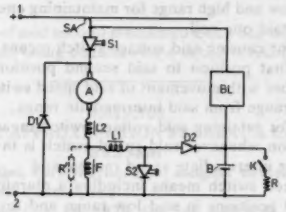
a source of a signal representing the actual speed of said motor; and

means responsive to said speed command signal and said actual speed signal for generating current command signals to said field and armature controllers wherein the normalized values of said current command signals are proportional to the square root of the motor torque at the desired motor speed represented by said speed command signal.

4,019,108
DRIVE EQUIPMENT SUPPLIED WITH DIRECT CURRENT

Sten Elvin, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Jan. 8, 1976, Ser. No. 647,501
Claims priority, application Sweden, Jan. 20, 1975, 7500545
Int. Cl.² H02P 7/10
U.S. Cl. 318—353 6 Claims

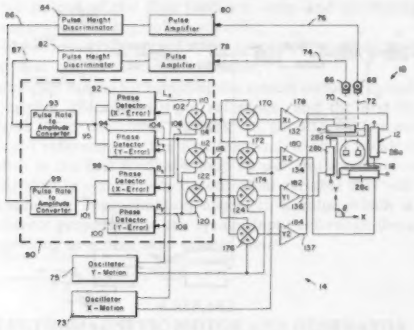


1. Drive equipment supplied with direct current, having a DC motor with a series field winding and means connecting a controllable semi-conductor rectifier working in pulse operation and a reactor in series with each other and in parallel with the field winding, for variable shunting of the field winding, means connecting a load object in parallel to the semi-conductor rectifier.

4,019,109
ALIGNMENT SYSTEM AND METHOD WITH MICROMOVEMENT STAGE

John H. McCoy, Newbury Park, and Paul A. Sullivan, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 469,154, May 13, 1974, abandoned.
This application Apr. 5, 1976, Ser. No. 673,553
Int. Cl.² G05B 19/18
U.S. Cl. 318—640 16 Claims


Pulse Height Discriminator
Pulse Amplifier
Pulse Height Discriminator
Pulse Amplifier
Phase Detector (X - Error)
Phase Detector (Y - Error)
Phase Detector (X - Error)
Phase Detector (Y - Error)
Pulse Rate to Amplitude Converter
Pulse Rate to Amplitude Converter
Oscillator Y - Motion
Oscillator X - Motion

1. In an alignment system for processing of semiconductor wafers, a device for producing micron movement in planar orthogonal and angular directions singly and in combination of a mask with respect to a semiconductor wafer, comprising:

a carrier having means for supporting one of the mask and the wafer, being substantially rectangular in configuration to define four orthogonally disposed sides, and including four ears orthogonally positioned with one another and respectively secured to and extending from said sides for forming outwardly projecting extensions from said carrier, said extensions respectively having a first face contiguous with one of said sides and a second face substantially at right angles with a second of said sides orthogonal to said one side;

a support including four anchor blocks rigidly affixed to said support, each of said anchor blocks including a face substantially parallel with and spaced from said second face of each of said ears;

four transducers, each of said transducers having means for providing at least an elongation therein and being positioned between each of said respective facing ones of said anchor block faces and said second faces of said ears;

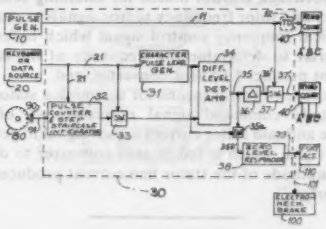
flat springs affixed respectively to each of said transducers and to each of said anchor block faces and said second faces of said ears, each of said flat springs having a pair of large parallel flat sides and a pair of short parallel flat sides of lesser width than said large parallel flat sides, and said large parallel flat sides being substantially parallel with said sides of said carrier; and

means coupled to each of said transducers and intercoupling said transducer for actuating said transducer means for elongating each of said transducers singly and in combination.

4,019,110
STEPPING MOTOR HAVING ROTATIONAL AND COUNTER ROTATIONAL MAGNETIC FIELD CONTROL

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Filed May 19, 1975, Ser. No. 579,028
Int. Cl.² H02K 37/00
U.S. Cl. 318—696 14 Claims



1. A stepping motor, comprising in combination:

a rotor;

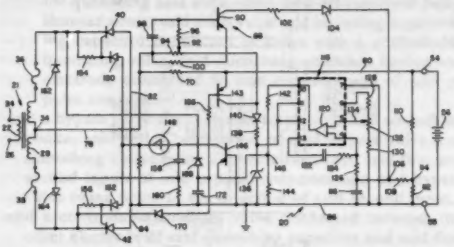
a stator structure, magnetically coupled to the rotor, having a first plurality of windings and a second plurality of windings, each one of the first plurality of windings being in space coincidence with only one of the second plurality of windings; and

a plurality of pole pieces integral with the stator structure and disposed at regular intervals therewithin, each one of the pole pieces having one each of the first and second plurality of windings thereon, the windings of said first plurality of windings on such of the pole pieces which are oppositely disposed being serially interconnected, the windings of said second plurality of windings on such of the pole pieces which are oppositely disposed being serially interconnected, said first plurality of windings when energized by phased pulse power producing magnetic flux in a first direction and a rotational torque upon the rotor, and said second plurality of windings when energized by phased pulse power producing magnetic flux in opposition to the first direction and a counter rotational torque upon said rotor substantially equal in magnitude to the rotational torque.

4,019,111
BATTERY CHARGER WITH AUTOMATIC CHANGE FROM CURRENT TO VOLTAGE MODE CONTROL

David H. Bennefeld, Anoka, Minn., assignor to Introl Corporation, Minneapolis, Minn.

Filed May 14, 1975, Ser. No. 577,175
Int. Cl.² H02J 7/04
U.S. Cl. 320—23 3 Claims



1. A battery charger for connection to a source of AC power comprising:

a rectifier means for supplying charging current to a battery to be charged;

a resistor in series with said rectifier means for providing a voltage drop thereacross caused by the flow of charging current through said resistor;

a first potentiometer connected in parallel with said resistor and having an adjustable contact;

a first transistor having a base connected to said adjustable contact so as to vary the conduction of said transistor in relation to the voltage drop across said resistor, said transistor providing an output voltage signal representative of the charging current;

a voltage divider in parallel with said battery providing a voltage signal representative of said battery voltage;

summing point means for algebraically summing said output voltage signal of said transistor and said voltage representative of said battery voltage;

an error amplifier having a pair of inputs and an output, one of said inputs connected to said summing point and the other of said inputs connected to a reference voltage, said amplifier producing an output signal representative of the difference between said voltages applied to said inputs;

means for controlling said rectifier means in accordance with said amplifier output signal to increase the flow of charging current when said battery voltage is below a threshold value and to decrease the flow of charging current when said battery voltage reaches said threshold value;

a second potentiometer having an adjustable contact connected to said other of said inputs of said error amplifier to provide a variable reference voltage; and

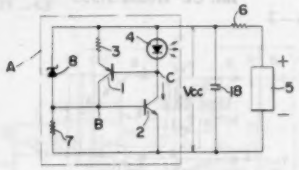
means for changing the voltage applied to said one input of said error amplifier in a direction generating an error amplifier output signal controlling said rectifier means to reduce the charging current when the charger is initially connected to a source of AC power.

4,019,112
BATTERY CHECKER CIRCUIT

Ken Satoh, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,288
Claims priority, application Japan, June 28, 1974, 49-74065; July 5, 1974, 49-79415; July 9, 1974, 49-80776
Int. Cl.² H02J 7/02
U.S. Cl. 320—48 6 Claims

1. A battery checker circuit comprising a voltage divider connected across a storage battery, said voltage divider including a first voltage detection resistor, a pair of complementary transistors, a second resistor connecting the emitter of a first one of the pair of transistors with one terminal of the battery; the collector of said first transistor being connected to the voltage detection resistor, and a light emitting display element connected in series with the other one of the pair of transistors across the battery, the base of the first transistor being connected to the junction between the display element and the other transistor, and the base of the other transistor being connected with the collector of the first transistor; a

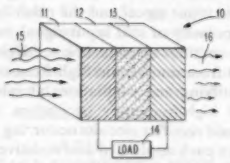


current limiting resistor connected intermediate the battery and the voltage divider and the transistors, and a capacitor connected across the series combination of said current limiting resistor and the battery, said capacitor repeatedly discharging through the series combination of the display element and the other transistor and charging through the current limiting resistor for operating the display element in a flashing manner wherein the rate of flashing is reduced to correspond to a reduction in the battery voltage level.

4,019,113
ENERGY CONVERSION DEVICE

James Keith Hartman, 664 South St., East Aurora, N.Y. 14052

Filed Nov. 20, 1974, Ser. No. 525,509
Int. Cl.² H02M 7/00
U.S. Cl. 321—1.5 14 Claims



1. An energy conversion device for conversion between thermal energy and electrical energy comprising:

A first element having a partially filled conduction band;

A second element joined to said first element along a first common surface thereof said second element having a conduction band separated from a valance band by an energy gap;

There being a first voltage barrier at said first common surface between said first element and said second element; and

A third element joined to said second element along a second common surface, said third element having a partially filled conduction band, there being a second voltage barrier at said second common surface between said second element and said third element;

Said first voltage barrier being greater than said second voltage barrier.

4,019,114

CIRCUIT ARRANGEMENT FOR THE UNGROUNDED TRANSMISSION OF SIGNALS THROUGH TESTING POINTS IN COMMUNICATION FACILITIES

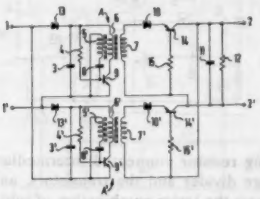
Josef Huellwegen, Altenbeken, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Filed Mar. 7, 1975, Ser. No. 556,410

Claims priority, application Germany, Mar. 12, 1974, 2411871

Int. Cl.² H02M 3/335

U.S. Cl. 321—2 **3 Claims**



1. A circuit arrangement for the ungrounded transmission of signals through testing points in communication facilities, said circuit arrangement comprising input terminal means and output terminal means and high-frequency oscillator means having an input thereto and an output therefrom and control means connected in circuit with said input to said high-frequency oscillator means and being responsive to one polarity of an input signal to said input terminal means for controlling the duration and magnitude of oscillations produced by said high-frequency oscillator means at said output therefrom and rectifier means and resistive load means connected in circuit with said output from said high-frequency oscillator means, said output terminal means being connected across said resistive load means, said oscillations at said output from said high-frequency oscillator means being rectified by said rectifier means and the rectified signal applied to said resistive load means for effecting the production of an output signal at said output terminal means which has a shape that corresponds to the shape of said input signal applied to said input terminal means, said circuit arrangement being free of power sources therein and utilizing only said input signal for an operation of said circuit arrangement, said high-frequency oscillator means including two high-frequency oscillators, said control means including two control circuits, one being responsive to one polarity of said input signal and the other being responsive to the opposite polarity of said input signal, said rectifier means including two rectifier circuits, one rectifying said oscillations at said output from one of said high-frequency oscillators and the other rectifying and oscillations at said output from the other of said high-frequency oscillators, and said rectified signals from said rectifier circuits occurring at spaced intervals of time and are each applied to said resistive load means which is common to both of said rectifier circuits so that the shape of said two polarity input signals is reproduced at said output terminal means.

4,019,115

ENERGY TRANSMISSION SYSTEM WITH A COMMON MAIN FOR DIRECT CURRENT

Hans-Peter Lips, Schriesheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

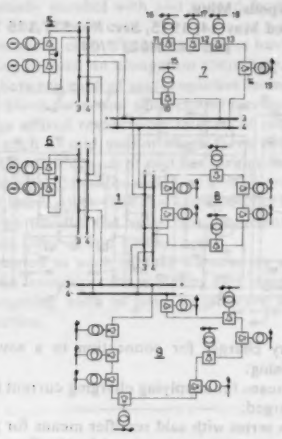
Filed July 14, 1975, Ser. No. 595,877

Claims priority, application Germany, July 25, 1974, 2435755

Int. Cl.² H02M 7/00

U.S. Cl. 321—27 R **4 Claims**

1. In an energy transmission system provided with a common main which conducts direct-current at high voltage and is fed from at least one three-phase network or power station through rectifiers, the improvement characterized in that connected to a plurality of points in the common main, between the poles are output groups connected in parallel, each of which consists of a plurality of partial inverters connected



in series between the poles of the common main, associated with each of which partial inverters is an alternating-current network or partial network to be supplied, and that a regulating device is provided to monitor the electrical quantities.

4,019,116

COMMUTATION CIRCUIT FOR A CONVERTER

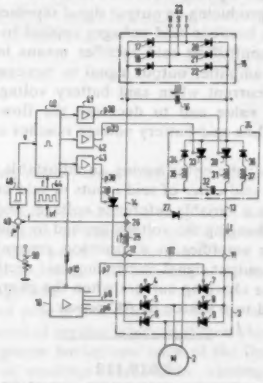
Herwig Klautschek, Furth, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 25, 1975, Ser. No. 635,149

Claims priority, application Germany, Dec. 3, 1974, 2457109

Int. Cl.² H02M 7/515

U.S. Cl. 321—45 C **6 Claims**



1. A commutation circuit for a frequency converter comprising:

a p-pulse converter including controllable valves, first and second inputs, and an output adapted to be connected to a load;

a DC voltage source for supplying a constant DC voltage, said voltage source having first and second output terminals;

an intermediate DC link connected between said DC voltage source and said p-pulse converter, said link comprising:

a smoothing choke connecting the first output terminal of said DC voltage source to said first input of said p-pulse converter;

a DC control means for controlling the DC current in said link and connecting the second output terminal of said DC voltage source to said second input of said p-pulse converter, said DC control means comprising:

a controllable main valve, and a quenching arrangement for quenching said main valve, said arrangement being shunted across said main valve and including a quenching capacitor connected in series with a controllable quenching valve, said quenching capacitor having one electrode connected to said second input of said p-pulse converter,

and a bypass valve connected in series with said smoothing choke, said series connection of said bypass valve and smoothing choke being connected between said first and second inputs of said p-pulse converter and said bypass valve being poled in the direction of said second input,

and a controllable auxiliary valve connected between the other electrode of said quenching capacitor and said first input of said p-pulse converter such that when said auxiliary valve is fired the voltage of said quenching capacitor is present as a cut-off voltage at said controllable valves of said p-pulse converter, said quenching capacitor thereby acting additionally as a quenching capacitor for the sum-quenching of said controllable valves.

4,019,117

CIRCUIT ARRANGEMENT FOR AN INVERTER

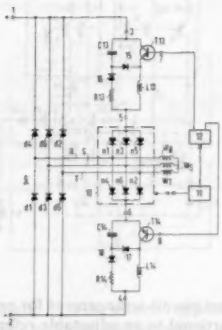
Horst Gehm, Rottenbach; Werner Gratzke, Erlangen, and Wilhelm Linden, Erlangen-Buchenbach, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 3, 1975, Ser. No. 610,053

Claims priority, application Germany, Sept. 9, 1974, 2443025

Int. Cl.² H02M 7/155

U.S. Cl. 321—45 R **5 Claims**



1. In an inverter having controlled rectifiers in a bridge circuit with recovery diodes also in a bridge circuit with the junction points of the recovery diode bridge circuit coupled to the corresponding junction points of the inverter bridge circuit, both the inverter bridge circuit and diode bridge circuit being coupled across positive and negative d.c. voltage inputs, an improved circuit arrangement comprising:

a. symmetrically arranged electronic switches coupling the positive and negative d.c. voltage inputs to the inverter bridge circuit;

b. an auxiliary circuit having an inductance coupled in series with the load path of each electronic switch and a series circuit comprising a capacitor, a resistor and a diode coupled in parallel across the series circuit made up of said inductance and said load path, for limiting the current rate of rise and voltage rise across said load paths; and

c. wherein the diode recovery bridge is coupled across the d.c. input terminals ahead of the electronic switches.

4,019,118

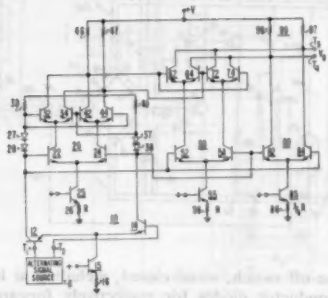
THIRD HARMONIC SIGNAL GENERATOR

Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,563

Int. Cl.² H02M 5/16

U.S. Cl. 321—65 **16 Claims**



9. A third harmonic signal generator circuit comprising:

a source of alternating input signals proportional to sin θ;

a first signal multiplier comprising a first amplifier having input and common electrodes coupled to said source, and an output electrode, for providing a first output signal proportional to $\sin^2 \theta$;

a second signal multiplier comprising a second amplifier having an input electrode coupled to said output electrode of said first amplifier, a common electrode coupled to said source, and an output electrode, for providing a second output signal proportional to $\sin^3 \theta$ having a first harmonic component proportional to sin θ and a third harmonic component proportional to sin 3θ;

a third amplifier having an input electrode coupled to said source, a common electrode and an output electrode, for providing a third output signal in predetermined magnitude and polarity relation with said first harmonic component sin θ; and

a combining network coupled to said outputs of said second and third amplifiers, for combining said second and third output signals to cancel said first harmonic component of said second signal and thereby provide an output signal proportional to said third harmonic component sin 3θ and substantially devoid of said first harmonic component.

4,019,119

DC TO AC VOLTAGE CONVERTER WITH AUTOMATIC START-STOP CONTROL OF MOTOR-GENERATOR SET

Joseph S. Naber, Marengo, Ill., assignor to Applied Motors, Inc., Rockford, Ill.

Continuation-in-part of Ser. No. 568,868, April 17, 1975, abandoned. This application Apr. 1, 1976, Ser. No. 672,792

Int. Cl.² H02P 9/06; H02M 7/64

U.S. Cl. 322—8 **29 Claims**

1. In a control system for starting and stopping a motor-alternator set, the motor being rotationally driven when energized from a dc. battery and the alternator being connected to supply ac. current to a load unit having a series on-off switch, the combination comprising:

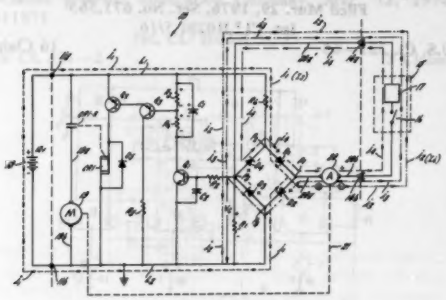
a. means including a current limiting resistor and a forwardly poled semiconductor junction adapted for connection across said battery to draw a standby dc. trickle current,

b. means connecting said alternator, load unit and on-off switch to said semiconductor junction so that closure of

said switch results in initial dc. current flow through the alternator, load unit and switch,

c. means responsive to said initial dc. current flow for connecting said motor across said battery to energize and start the motor,

d. permanently connected means for conducting ac. current, generated by said alternator, through said load unit



and on-off switch, when closed, including at least two semiconductor diodes for respectively forwardly conducting the alternate half cycles of such current, and

e. means responsive to the pulsating forward voltage drop across at least one of said diodes for maintaining said motor connected across said battery,

whereby said motor is started or stopped automatically when said on-off switch is respectively closed or opened.

4,019,120

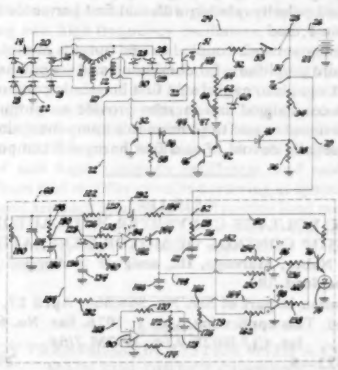
FAULT INDICATOR FOR MOTOR VEHICLE BATTERY CHARGING SYSTEMS

Gerald T. Fattic, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 2, 1976, Ser. No. 672,872

Int. Cl.² H02J 7/24; G08B 21/00; G01R 31/02

U.S. Cl. 322—28 **5 Claims**



1. A malfunction indicator for a motor vehicle battery charging system comprising, an alternating current generator having a polyphase output winding and a field winding, a first fullwave bridge rectifier connected to said output winding, a battery connected across the direct current output terminals of said first bridge rectifier to be charged thereby, second rectifier means connected with said output winding, said second rectifier means and certain of the rectifiers of said bridge rectifier providing a field energizing rectifier circuit having direct current field energizing terminals, voltage regulating means including a field current control means, means connecting said field winding and said field current control means across said field energizing terminals of said field energizing rectifier circuit to provide regulated field excitation for said generator, an amplifier having first and second inputs operative to provide an output signal when the input currents to said amplifier inputs differ by a predetermined amount, means connecting the inputs of said amplifier to said field energizing terminals including a diode connected across said amplifier input terminals and a capacitor connected between one amplifier input terminal and one field energizing terminal, said diode and capacitor operative to cause a differential input current to be supplied to said amplifier inputs of sufficient magnitude as to cause said amplifier to develop a first output fault signal in response to the occurrence of sudden voltage transitions across said field energizing terminals indicative of certain faults in said system, means connected to said battery and to one of said field energizing terminals for providing a second fault signal when a predetermined voltage difference exists therebetween indicative of faulty field excitation, and fault signal indicating means operative to respond to said first and second fault signals.

4,019,121

CIRCUIT ARRANGEMENT FOR PRODUCING A COMPENSATED CURRENT

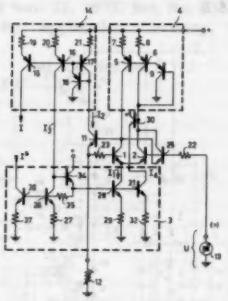
Hans Heinrich Feindt, Pinneberg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,256

Claims priority, application Germany, Dec. 14, 1974, 2459271

Int. Cl.² G05F 1/56

U.S. Cl. 323—4 **6 Claims**



1. A transistor circuit arrangement for producing a current which is proportional to an adjustable reference voltage and/or the admittance of a variable resistor, and which is compensated for temperature variations and supply voltage variations, comprising: a differential amplifier including a first transistor to the base of which the reference voltage is applied, and a second transistor; a third transistor the emitter circuit of which is connected to the base of the second transistor and includes the variable resistor while the base of which is connected to the collector of the second transistor; a first current mirror circuit supplied by the supply voltage and connected between the collector circuits of the first and the second transistor; a second current mirror circuit supplied by the supply voltage and connected to the collector circuit of the third transistor to supply a control current I_2 thereto, said second current mirror circuit further supplying an input current I_3 and an output current I; and a third current mirror circuit supplied by said input current I_3 and connected to the emitter circuits of the first and the second transistor to determine a common emitter current I_1 thereof.

4,019,122

STABILIZED POWER SUPPLIES

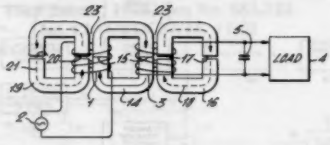
Kenneth Augustine Ryan, Wishaw, Scotland, assignor to Telcon-Magnetic Cores Limited, England

Filed Aug. 7, 1975, Ser. No. 602,511

Claims priority, application United Kingdom, Aug. 14, 1974, 35766/74; Feb. 20, 1975, 7176/75

Int. Cl.² G05F 3/06

U.S. Cl. 323—60 10 Claims



1. A constant-voltage transformer comprising a primary coil, a secondary coil, a tuning capacitor connected across said secondary coil, a magnetically continuous magnetic core linking both said primary coil and said secondary coil, a magnetically discontinuous magnetic core linking said secondary coil but not said primary coil and another discontinuous magnetic core linking said primary coil but not said secondary coil.

4,019,123

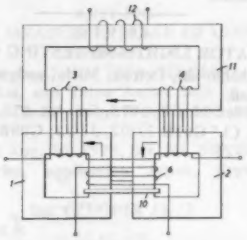
MAGNETIC AMPLIFIER ARRANGEMENTS

Arthur Maskery, London, England, assignor to Westinghouse Brake and Signal Co. Ltd., England

Filed Sept. 18, 1973, Ser. No. 398,430

Int. Cl.² G05F 1/32

U.S. Cl. 323—85 2 Claims



1. Electropneumatic braking control apparatus comprising a magnetic amplifier arrangement including a first magnetizable core, a second magnetizable core and a third magnetizable core, a first full-wave a.c. input winding wound about the first core and the third core, a second full-wave a.c. winding equivalent to the first winding and wound about the second core and the third core, common d.c. control winding means wound about the first and second cores with the sense thereof relative to the first and second windings being such that fluxes normally linked with the d.c. winding means, due to alternating current in the a.c. windings, mutually cancel, and a secondary winding being provided on the third core for producing an output from the magnetic amplifier arrangement, means for applying a signal to said d.c. control winding means which is the resultant of a demand signal and an opposed regenerative braking signal, and means connected to the output of said secondary winding on said third core for producing a control signal for controlling an electropneumatic brake, said arrangement including a common short circuited winding about the first and second cores.

4,019,124

APPARATUS FOR COMPENSATING REACTIVE POWER IN A THREE-PHASE NETWORK

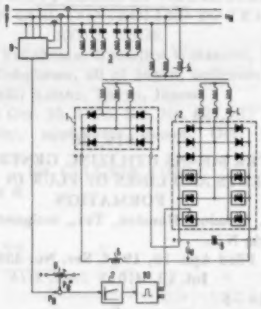
Gottfried Möltgen, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 11, 1976, Ser. No. 665,876

Claims priority, application Germany, Mar. 25, 1975, 2513168

Int. Cl.² H02J 3/18

U.S. Cl. 323—102 3 Claims



1. A cycloconverter apparatus for compensating for the reactive power in a three-phase network comprising:

an uncontrolled converter adapted to be connected to said network for generating an impressed DC voltage;

a self-commutating inverter for producing an output signal;

inductance means for coupling said output signal to said network;

an intermediate DC link for coupling said impressed voltage to said inverter;

and means for controlling said inverter such that said output signal is a pulse width modulation signal having a pulse width angle which can be varied, said pulse width modulation signal comprising a fundamental frequency component which when coupled by said inductances is in phase opposition to the network voltage and which has an amplitude which varies with variations in said pulse width angle.

4,019,125

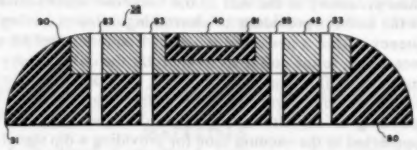
WELL LOGGING PAD DEVICES HAVING SELECTIVE DIFFERENTIAL RELIEF

Wilbur Lee Daniel, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 17, 1975, Ser. No. 623,868

Int. Cl.² G01V 3/18; E21B 49/00

U.S. Cl. 324—1 6 Claims



6. An apparatus for investigating earth formations traversed by a borehole, comprising:

an elongated support member adapted for movement through a borehole; and

an auxilliary pad member connected to said support member and adapted to be urged against the borehole wall, said pad member having first and second surfaces, said first surface having at least one electrode and being

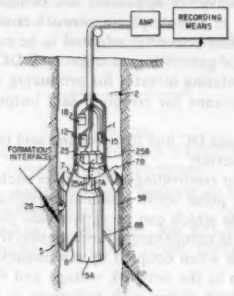
adapted to engage the borehole wall, and said pad member having at least one fluid channel between said first and second surfaces and means within said at least one channel responsive to differential pressure between said first and second surfaces for providing pressure relief between said first and second surfaces.

4,019,126

DIPMETER MEANS UTILIZING GENERATED EDDY CURRENTS AND LINES OF FLUX IN AN EARTH FORMATION

Richard A. Meador, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Apr. 10, 1974, Ser. No. 459,742
Int. Cl.² G01V *3/08, 3/18*
U.S. Cl. 324—5 **1 Claim**



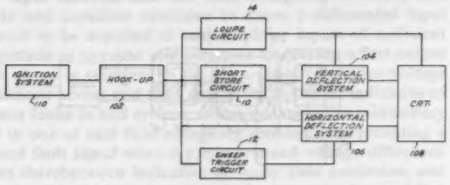
1. A dipmeter comprising a logging tool adapted to be passed through a borehole traversing an earth formation which includes means for sensing an angle of inclination of the borehole and providing an inclination signal corresponding thereto, means for sensing an azimuth angle for the logging tool and providing a corresponding azimuth signal, means for sensing the diameter of the borehole and providing a signal corresponding thereto, and at least three circuit means for generating lines of flux and eddy currents in the earth formation, said circuit means being in a predetermined spatial relationship to each other, and each circuit means includes a radio frequency oscillator comprising a coil urged in substantially close proximity to the side of the borehole, means connected to the coil for providing an alternating current, having a frequency within a preferred range of frequencies of **50** to **200** megahertz, to the coil so as to energize the coil, thereby creating lines of flux and eddy currents, said alternating current means includes a vacuum tube having a grid current corresponding to the alternating current in the coil, and means connected to the vacuum tube for providing a dip signal corresponding to said lines of flux and eddy currents in accordance with the grid current; surface apparatus comprising means for providing a signal corresponding to the depth of the logging tool in the borehole, and means for recording signals; and transmission means connecting the recording means to the sensing means and to all the dip signal means for providing the signals from the sensing means and the dip signal means to the recording means so that the signals are recorded by the recording means.

4,019,127

ANALOG OSCILLOSCOPE

Gary F. Comiskey, Evanston; Gregory N. Hesse, Lombard, both of Ill., and Johannes Peter Bovenlander, Kormmenie, Netherlands, assignors to Sun Electric Corporation, Chicago, Ill.

Filed Dec. 12, 1975, Ser. No. 640,220
Int. Cl.² F02P *17/00*
U.S. Cl. 324—16 S **14 Claims**



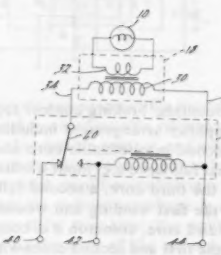
1. In a device for displaying an ignition signal of an engine having a variable speed, said device including sweep means for varying sweep time, and improved means for correlating said variable speed and said sweep time comprising, in combination:
generator means for generating a sample pulse and a dump pulse in response to said ignition signal, said dump pulse sequentially following said sample pulse;
first voltage storage means;
integrator means for producing a ramp voltage;
first controllably conductive means for discharging said integrator means in response to said dump pulse;
first switch means for selectively interconnecting said first voltage storage means and said integrator means in response to said sample pulse, whereby said first voltage storage means is charged to a sample sweep voltage substantially inversely proportional to said variable speed;
reciprocal means for producing an output voltage substantially proportional to said variable engine speed in response to said sample sweep voltage; and
means for interconnecting said reciprocal means and said sweep means.

4,019,128

INDICATOR LIGHT AND TESTING CIRCUIT

Jerome E. Chebowski, Detroit, Mich., assignor to Rees, Inc., Fremont, Ind.

Filed May 8, 1975, Ser. No. 575,593
Int. Cl.² G01R *31/02, 31/22;* **G08B** *29/00*
U.S. Cl. 324—21 **6 Claims**



6. A pilot light unit comprising,
a pilot light,
a transformer connected to said pilot light,
relay means connected in circuit to said transformer, said relay means having a relay coil, switching means, a signal line terminal, a test line terminal and a main line terminal,
said signal line and main line terminals adapted to be connected to and energized by a control circuit,
said test line and main line terminals adapted to be connected to and energized by a test circuit, and
said switching means normally biased to connect in circuit said signal line terminal with said transformer whereby

said pilot light is energized by said control circuit, and movable subject to energization of said relay coil by said test circuit to connect in circuit said test line terminal with said transformer, whereby said pilot light is energized by said test circuit and isolated from said control circuit.

4,019,129

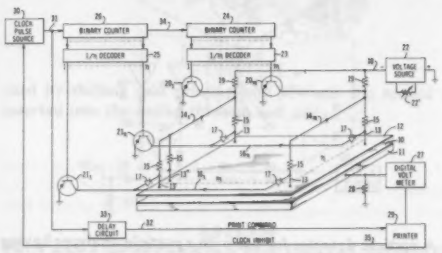
METALLIC PLATING TESTING APPARATUS

Thomas George Grau, Westerville, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 2, 1975, Ser. No. 582,722

Int. Cl.² G01N *27/46, 31/02*

U.S. Cl. 324—30 R **12 Claims**



1. Apparatus for testing the surface conditions of a metallic plating comprising an electrolytic medium in electrical contact with said plating, an array of cathode elements in electrical contact with said medium, means for applying a test potential individually to said cathode elements in a predetermined sequence, means electrically connected to said plating for measuring currents generated in said medium by said potential between said cathode elements and said plating and for generating output data representative of the magnitude of said currents, and presentation means controlled responsive to said data for presenting said data in a sequence corresponding to said predetermined sequence.

4,019,130

METHOD FOR MEASURING WEAR OF COOLING CELL ASSEMBLY

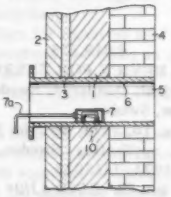
Yoshiyasu Sakamoto, Osaka; Tatsuo Hiroshima, Nishinomiya; Toshihiko Sakai, and Tetuo Asano, both of Osaka, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Aug. 26, 1975, Ser. No. 607,905

Claims priority, application Japan, Sept. 3, 1974, 49-101024

Int. Cl.² G01R *33/12*

U.S. Cl. 324—34 R **4 Claims**



1. A method for measuring the amount of wear of a high-temperature furnace cooling cell assembly of a ferromagnetic material, comprising the steps of:

providing an inspection hole through a portion of the furnace wall into the inside of the furnace;

moving a sensor consisting of an iron core having primary and secondary windings wound thereabout along the surface of the wall which defines said inspection hole while supplying an alternating current to the primary winding of said sensor;

measuring the variation in output voltage of the secondary winding of said sensor and when the output voltage drops abruptly, measuring the length of the sensor inserted into the hole to thereby determine the thickness of the cooling cell assembly; and

comparing the thickness of the cooling cell assembly at the time of the measurement with the initial thickness of the cooling cell assembly for determining the amount of wear of the cooling cell assembly.

4,019,131

METHOD AND APPARATUS FOR MEASURING THE SHAPE OF THE WAVY EDGES OF METAL STRIPS USING A DETECTION COIL CONTROLLED TO TRACK THE STRIP EDGE

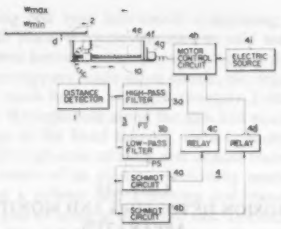
Takeo Yamada, Yokohama; Katsujiro Watanabe, Tokyo, and Seigo Ando, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 30, 1975, Ser. No. 627,137

Claims priority, application Japan, Oct. 31, 1974, 49-125816

Int. Cl.² G01R *33/12*

U.S. Cl. 324—34 R **10 Claims**



1. In a method of measuring the contour of the wavy edge of a metal strip wherein a single detection coil means of an electromagnetic type non-contacting distance measuring device is disposed near the edge of a running metal strip, offset therefrom in the direction of the strip thickness with the center line of the coil positioned a predetermined lateral distance from the edge of said strip, for measuring the distance in the direction of the strip thickness between said single detection coil means and the surface of said metal strip near said edge, the improvement which comprises the steps of

separately deriving out a high frequency component and a low frequency component from the output of said single detection coil means,

maintaining the lateral distance between the center line of said single detection coil means and the strip edge at said predetermined value by using said low frequency component to control the lateral position of said coil relative to said strip edge, and

measuring the contour of the wavy edge of the metal strip by using said high frequency component, which high frequency component varies as a function of the distance of said coil from said surface in the direction of the strip thickness, while said lateral distance is maintained at said predetermined value.

4,019,132

METHOD AND APPARATUS FOR DETERMINING THE MOISTURE CONTENT OF DIFFERENT KINDS OF MATERIALS

Ernst Loch, Uster, Switzerland, assignor to Zellweger, Ltd., Switzerland

Filed May 22, 1975, Ser. No. 579,950

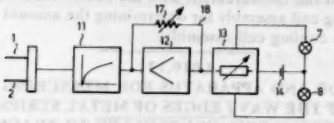
Claims priority, application Switzerland, May 22, 1974, 7008/74

Int. Cl.² G01R *27/02*

U.S. Cl. 324—65 R **24 Claims**

1. A method for determining the moisture content of different kinds of materials by measuring their conductivity com-

prising the steps of passing an electrical measuring current through the material whose moisture content is to be measured, detecting said measuring current which is indicative of the conductivity of the material, directly coverting the measuring current into a measuring voltage corresponding to the



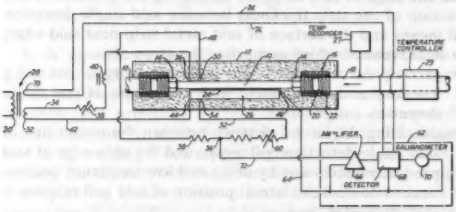
logarithm of said current, applying the measuring voltage to an amplifier having a low-valued input resistance, and determining the moisture content of the material by adjusting a scale graduated in moisture values in accordance with the output of the amplifier.

4,019,133

CORROSION DETECTING AND MONITORING APPARATUS

Robert E. Manley, Lower Burrell, and John D. McCoy, Gibsonia, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 29, 1975, Ser. No. 644,968
Int. Cl.² G01R 27/02
U.S. Cl. 324—65 CR **10 Claims**



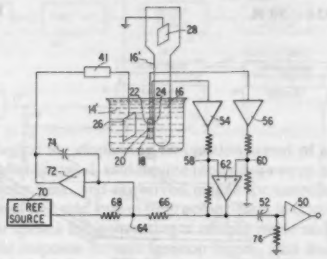
1. Apparatus for measuring the rate of corrosion of a ferromagnetic metal by a flowing fluid comprising a tubular test specimen of the ferromagnetic metal, means for flowing the fluid through the test specimen, a tubular reference specimen of the ferromagnetic metal adjacent to the test specimen, said reference specimen being of substantially the same length, diameter and wall thickness as the test specimen, electrical insulation separating the test specimen and the reference specimen, a housing enclosing the test specimen and the reference specimen, thermal insulation within the housing around the test specimen and the reference specimen adapted to maintain the temperature of the specimens within 1° F. of one another, an alternating current source connected to the test specimen and the reference specimen to pass a current therethrough, and electrical leads attached to the outer surface of the test specimen and to the reference specimen connecting the specimens in a Wheatstone bridge circuit for measuring the resistance of the test specimen relative to the reference specimen to indicate the extent of corrosion of the test specimen.

4,019,134

PARTICLE DETECTOR INDEPENDENT OF ERRORS CAUSED BY CHANGES OF ELECTROLYTE CONDUCTIVITY AND ELECTRODE POLARIZATION

Walter R. Hogg, Miami Lakes, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Continuation-in-part of Ser. No. 387,548, Aug. 13, 1973, Pat. No. 3,944,917. This application Mar. 11, 1976, Ser. No. 666,060
Int. Cl.² G01N 27/00
U.S. Cl. 324—71 CP **18 Claims**



1. A particle detector for use with a particle analyzer having a microscopic particle sensing zone which separates two bodies of fluid, the particles being caused to pass from one body to the other via the sensing zone and thereupon enabling the generation of a discrete signal pulse related to each so passed particle, said detector comprising: a pair of power electrodes and a pair of particle sensing electrodes positioned in the bodies of fluid relative to the sensing zone such that a sensing electrode and a power electrode both are disposed in each of the bodies of fluid, voltage means for establishing a voltage between said particle sensing electrodes, such voltage having a D.C. component which is substantially constant, said voltage establishing means including feedback means coupling said sensing electrodes to said power electrodes for causing said particle detector to be substantially independent of power electrode polarization, and an output circuit including a high input impedance voltage sensitive detecting means coupled to said particle sensing electrodes for detecting the particle passing sensed by said sensing electrode and providing a pulse related to each passed particle in a manner such that said particle detector operates substantially independent of slow changes of conductivity in the bodies of fluid.

4,019,135

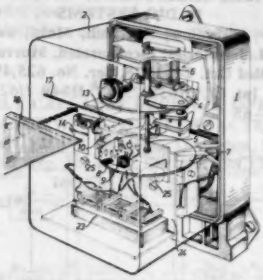
RECORDING DEVICE FOR ENERGY METERS

Christer Edvin Löfdahl, Danderyd, Sweden, assignor to AB Samefa, Stockholm, Sweden

Filed Dec. 10, 1974, Ser. No. 531,372
Claims priority, application Sweden, Dec. 11, 1973, 7316727; Nov. 29, 1974, 7415023
Int. Cl.² G01R 13/04
U.S. Cl. 324—113 **9 Claims**

1. A device for periodic, automatic, readable recording of a meter value from a consumption measuring meter comprising: a casing attachable to an otherwise conventional meter and provided with a slot; a printing unit disposed within said casing and located out of the plane of said slot in order to be tamper-proof, said printing unit being composed of an identification data printer and a consumption value printer and being adapted upon insertion of a record card in the slot of the casing to apply to the record card a visually readable marking of the identification data and meter consumption value; and a

push button connected to said printing unit and manually actuable for causing said marking to be applied to the record



card by shifting said printing unit towards the record card inserted into the casing through said slot.

4,019,136

PROCESS AND APPARATUS FOR DIGITAL INDICATION OF ELECTRIC MEASURING AND/OR TEST VALUES

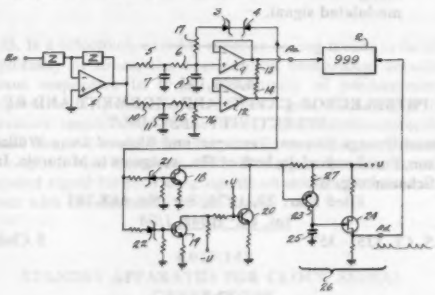
Friedrich Wenz, Seeheim, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Dec. 29, 1975, Ser. No. 645,303

Claims priority, application Germany, Jan. 3, 1975, 2500154

Int. Cl.² G01R 1/20, 17/06

U.S. Cl. 324—128 **6 Claims**



1. An electrical circuit for digitally displaying an input electrical signal comprising:

a first low pass filter for receiving said signal and removing fluctuations therefrom, including an operational amplifier functioning as an impedance transformer,

means for connecting the output of said first filter to digital display means,

a second low pass filter for receiving said signal and removing fluctuations therefrom, said second filter having an adjusting time in response to changes in the value of said signal less than the adjusting time of said first filter,

means for comparing the outputs of said first and second filters and producing an electrical signal indicating the difference including a differential amplifier with one input connected to the output of said operational amplifier and a second input connected to the output of said second filter,

means for varying the output of said first filter in accordance with said difference so as to reduce said difference including first and second serially and oppositely connected Zener diodes connecting the output of said differential amplifier to the input to said operational amplifier.

4,019,137

MOVING COIL TYPE INSTRUMENT

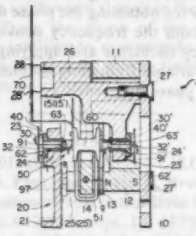
Shoji Takeda, and Yutaka Sugawara, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Dec. 19, 1975, Ser. No. 642,657

Claims priority, application Japan, Dec. 26, 1974, 50-2600[U]

Int. Cl.² G01R 5/08, 1/02

U.S. Cl. 324—150 **1 Claim**



1. A moving coil type instrument comprising: an annular magnetic path plate; a frame attached to said magnetic path plate, the frame having two arms each having a through-hole; a pair of boss-stoppers made of an elastic, electrically insulating material, each having an approximately T-shaped cross-section and a through-hole along the axis and equipped with a tension spring at the head thereof, each boss-stopper being fitted in the through-hole of each arm of said frame; a mounting member made of an elastic, electrically insulating material, mounting a pointer and a moving coil mounting frame and having a pair of integral bosses of said electrically insulating material with each boss having diametrally small and large portions, each boss being attached to an end of a tension band, the moving coil and the pointer being diametrically opposite to each other with respect to the axis of the two bosses; an annular permanent magnet with part cut out, attached to said magnetic path plate; and a core installed opposite said permanent magnet across a gap, thus forming a magnetic path with said magnetic path plate, the core being surrounded with said moving coil; the other ends of said tension bands being connected to said tension springs so that the diametrally small portions of said bosses sit in said boss-stoppers respectively.

4,019,138

FREQUENCY SYNCHRONIZING SYSTEM FOR SATELLITE COMMUNICATION

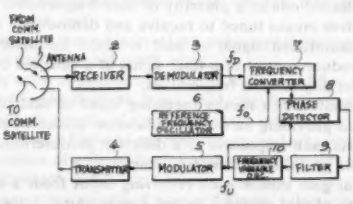
Tatsuo Watanabe, Mitaka, and Hideki Saito, Tachikawa, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Feb. 19, 1976, Ser. No. 659,362

Claims priority, application Japan, Feb. 24, 1975, 50-21867

Int. Cl.² H04B 7/14

U.S. Cl. 325—4 **2 Claims**



2. A frequency synchronizing circuit for satellite communication, comprising:

a variable frequency oscillator for generating a reference transmission signal of a frequency approximate to the reference frequency;

a receiving circuit for receiving the reference transmission signal through the communications satellite;

a reference oscillator for generating a signal of a constant frequency substantially twice as high as the reference frequency;

a frequency converter for producing a signal of a frequency of the difference between the outputs from the reference oscillator and the receiving circuit; and

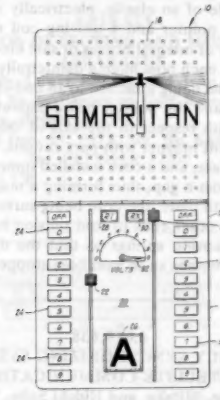
a phase detector for obtaining the phase difference between the outputs from the frequency converter and the variable frequency oscillator and applying the phase difference to the variable frequency oscillator to control it to decrease the phase difference.

4,019,139

INTERACTION MULTI-STATION ALARM SYSTEM

Jose I. Ortega, 212 W. Cammack, Shawnee, Okla. 74801

Filed Apr. 28, 1975, Ser. No. 572,386
Int. Cl.² H01B *1/38*
U.S. Cl. 325—16 **7 Claims**



1. Combination apparatus for transmitting and receiving alarm indication as used in plurality to consititue a vigilance alarm network, comprising:

transmitter means which is energizable for selectively generating a preselected tone modulated output transmission signal of selected frequency, said tone modulation being a selected one of a plurality of tone frequencies;

receiver means tuned to receive and demodulate an output transmission signal at said selected frequency and to produce output of a tone signal at a selected one of the plurality of tone frequencies;

resonant switch means receiving input of said tone signal and providing an output indication at one of plural outputs each responsive to a different predetermined one of said plurality of tone frequencies;

plural gate means each receiving input from a respective one of said resonant switch means plural outputs to generate a characteristic gate output in response to switch means output indication; and

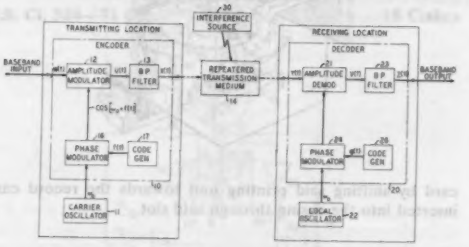
plural indicators each connected for energization by a respective one of said gate outputs.

4,019,140

METHODS AND APPARATUS FOR REDUCING INTELLIGIBLE CROSSTALK IN SINGLE SIDEBAND RADIO SYSTEMS

Richard Barry Swerdlow, Haverhill, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 24, 1975, Ser. No. 625,491
Int. Cl.² H03B *23/00;* **H04B** *1/62*
U.S. Cl. 325—65 **46 Claims**



11. In a transmission system of the type wherein a coded, amplitude-modulated signal is transmitted from a first to a second location, said system including, at said second location:

means for generating a local carrier wave; and

means, connected to said local carrier wave generating means, for demodulating said amplitude-modulated signal, the improvement which comprises:

means for generating a local coding signal which corresponds to the signal priorly employed at said first location to encode said amplitude-modulated signal; and

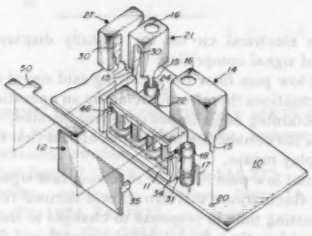
means for phase-modulating said local carrier wave with said local coding signal, thereby to cause said demodulating means to decode said coded amplitude-modulated signal.

4,019,141

PRESELECTOR CAVITY ARRANGEMENT AND RF SELECTIVITY ASSEMBLY

Daniel Orange Numan, Tamarac, and Richard Dean Williamson, Fort Lauderdale, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 22, 1976, Ser. No. 668,761
Int. Cl.² H04B *1/08*
U.S. Cl. 325—357 **8 Claims**



1. An improved preselector cavity and RF selectivity shielding arrangement for the RF circuitry of a radio receiver, the arrangement comprising:

a cast preselector cavity having a plurality of apertures, each aperture being substantially surrounded by a boss;

a plurality of adjoining housings, each having a slot in at least one side, each slot dimensioned to receive one of the bosses of said cavity;

a plurality of interconnections between portions of the RF circuitry, said portions being contained within the cavity and the several housings, and said interconnections being

made through said apertures, at least one of said interconnections comprising a loop from one circuitry portion which to substantially encircles a coil form in another of said circuitry portions; and

a printed circuit board for mounting the housings.

4,019,142

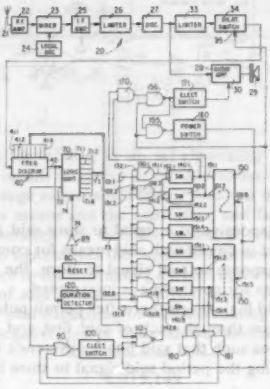
SELECTIVELY CALLABLE RECEIVER OPERATED IN ACCORDANCE WITH TONE CHARACTERISTICS

Keith H. Wycoff, 1205 N. Tyler St., Lexington, Nebr. 68850

Filed Aug. 16, 1974, Ser. No. 498,172

Int. Cl.² H04J 3/12

U.S. Cl. 325—392 **47 Claims**



45. In a selectively callable receiver having means to furnish a plurality of tones, the combination comprising decoding means responsive to tones respectively of predetermined frequencies for producing a decoded signal indicative of the durations respectively of the tones, and duration-detecting means coupled to said decoding means and having a plurality of outputs, said detecting means being responsive to said decoded signal for providing signals on said outputs in accordance with the durations of the tones.

4,019,143

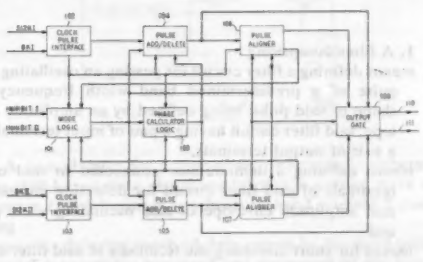
STANDBY APPARATUS FOR CLOCK SIGNAL GENERATORS

Joseph Michael Fallon, Old Bridge Township, Middlesex County, and Nathan Harold Stochel, Edison, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 10, 1976, Ser. No. 684,717

Int. Cl.² H03K 1/17

U.S. Cl. 328—71 **10 Claims**



1. A clock control circuit having first and second states and an intermediate correction state and including means for producing pulse signals, first and second sources of timing signals, means for aligning the phase of the producing means to coincide with the phase of signals applied thereto, means effective during the first state for applying signals derived from the first source timing signals to the producing means and means effective during the second state for applying signals derived from the second source timing signals to the producing means;

characterized by

means effective during the intermediate correction state for precluding the application signals to the producing means and for modifying the phase of the producing means incremental quantities to compensate for phase differences between the second source timing signals and the first source timing signals.

4,019,144

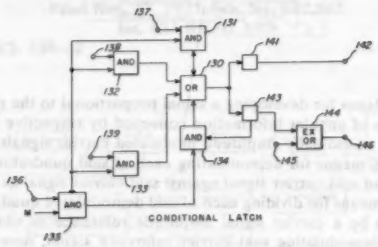
CONDITIONAL LATCH CIRCUIT

Neil R. Lincoln, St. Paul, and David R. Resnick, Arden Hills, both of Minn., assignors to Control Data Corporation

Division of Ser. No. 612,837, Sept. 12, 1975. This application Aug. 2, 1976, Ser. No. 710,940

Int. Cl.² H03K 19/04, 3/12

U.S. Cl. 328—92 **3 Claims**



1. A logic circuit comprising, in combination:

OR gate means having first, second and third inputs and an output;

first AND gate means having fourth and fifth inputs and an output;

second AND gate means having sixth and seventh inputs and an output;

third AND gate means having eighth and ninth inputs and an output;

fourth AND gate means having tenth and eleventh inputs and an inverted output and a non-inverted output;

means connecting the outputs of said first, second and third AND gate means to respective ones of said first, second and third inputs;

means connecting said inverted output of said fourth AND gate means to said fourth and sixth inputs;

means connecting said non-inverted output of said fourth AND gate means to said eighth input;

means connecting said output of said OR gate means to said ninth input; and

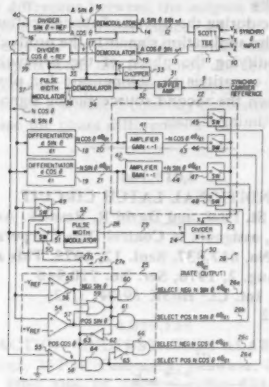
means connecting a binary clock pulse signal having a first binary value to said tenth input,

whereby upon application of a signal having said first binary value to said eleventh input, said circuit operates as an OR gate to signals of a second binary value appearing at either of said fifth and seventh inputs, and whereby upon application of a signal having said second binary value to said eleventh input, said circuit operates as a storage means to store signals of a second binary value appearing at either of said fifth and seventh inputs; said second binary value being different from said first binary value; and said output of said OR gate means providing the output of said circuit.

4,019,145
SYNCHRO RATE GENERATOR

John C. Rathe, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 24, 1976, Ser. No. 699,282
Int. Cl.² H03D 3/18; H03K 1/16
U.S. Cl. 328—133 8 Claims



1. Means for developing a signal proportional to the rate of change of angular information conveyed by respective quadrature sinusoidally amplitude modulated carrier signals comprising; means for demodulating each of said quadrature signals and said carrier signal against said carrier signal as reference, means for dividing each of said demodulated quadrature signals by a carrier signal amplitude reference as obtained from demodulating said carrier reference signal, means for differentiating each of the output signals from said means for dividing, and means for selectively dividing selected outputs from said means for differentiating by selected ones of the outputs of said means for dividing as a function of the angular information conveyed by said quadrature amplitude modulated carrier signals, the output from said means for selectively dividing comprising an output signal proportional to said rate of change of angular information.

4,019,146
CIRCUIT ARRANGEMENT FOR STORING AN ELECTRICAL ANALOG SIGNAL

Wolfgang Lesche, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 19, 1976, Ser. No. 659,522
Claims priority, application Germany, Feb. 20, 1975, 2507655
Int. Cl.² H03K 5/00; G11C 27/02
U.S. Cl. 328—151 8 Claims

1. A circuit arrangement for storing electrical analog signals comprising:

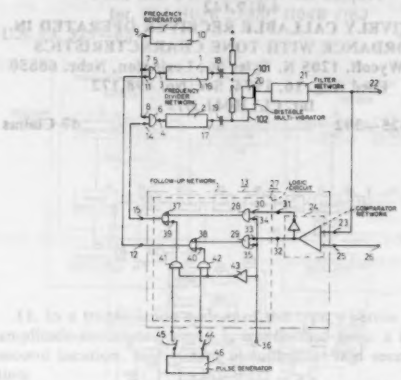
a. a frequency generator having at least one output;

b. first and second logic gate means connected in circuit to said generator;

c. first and second frequency dividing networks connected to respective outputs of said first and second logic means;

d. means for comparing the phase difference between the output signals of each of said dividing networks with the magnitude of the analog signal to be stored, said comparison means having two logic outputs connected to respective second inputs of said first and second logic gate means,

whereby the logic levels appearing on each of the outputs of said comparison means is a function of the comparison between said phase difference and the analog signal to be stored, said logic levels altering the number of pulses from said frequency generator flowing through each of said first and second logic gate means and into said frequency dividing networks such that said phase difference is made proportional to the analog signal to be stored; and



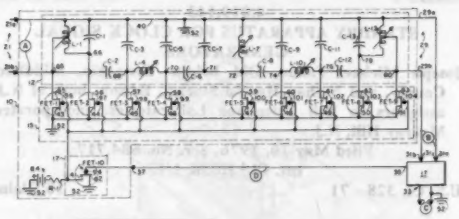
e. means responsive to a signal to store said analog signal connected in circuit with said means for comparing, such that in response to said signal to store, the operation of said means for comparing is interrupted,

whereby said logic levels thereafter permit pulses to continuously flow through each of said first and second logic gate means such that said phase difference remains constant during the period said signal to store is present.

4,019,147
BAND PASS FILTER FOR IMPULSE OPERATION

Robert W. Blomenkamp, Palo Alto, Calif., assignor to Physics International Company, San Leandro, Calif.

Filed Dec. 1, 1975, Ser. No. 636,447
Int. Cl.² H04M 1/00; H03H 7/14
U.S. Cl. 328—167 12 Claims



1. A filter comprising

means defining a filter circuit for passing an oscillating wave pulse of a predetermined band width frequency, the shape of said pulse being defined by an amplitude envelope, said filter circuit having a pair of input terminals and a pair of output terminals,

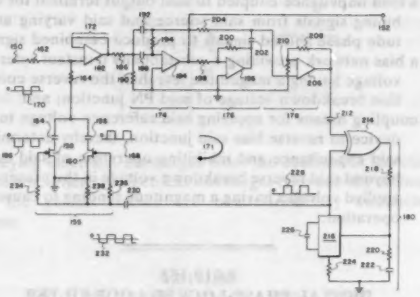
means defining a demodulator connected to said output terminals of said filter circuit for detecting increases in said amplitude envelope of said oscillating wave pulse, and

means for short circuiting the terminals of said filter circuit upon detection of a predetermined decrease in amplitude of said amplitude envelope at the end of said pulse.

4,019,148
LOCK-IN NOISE REJECTION CIRCUIT

Elbert N. Shawhan, West Chester, Pa., assignor to Sperry-Sun, Inc., Sugar Land, Tex.

Filed Dec. 29, 1975, Ser. No. 644,686
Int. Cl.² H04B 1/12
U.S. Cl. 328—167 14 Claims

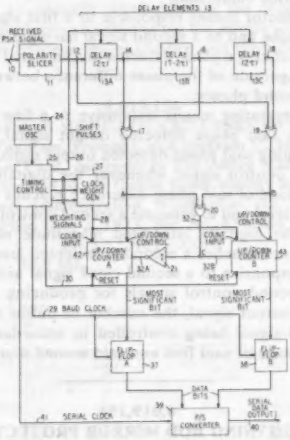


1. Circuit for locking in on an alternating current signal comprising: means receptive of the alternative current signal; a pair of storage capacitors; resistor isolation means between the receptive means and the capacitors; and feedback means connected between the isolation means and said capacitors responsive to signals from the capacitors for connecting one of the capacitors to the alternating current signal during positive half cycles of said alternating current signal and connecting the other of said capacitors to said alternating current signal during the negative half of the cycles of said signal.

4,019,149
CORRELATIVE DATA DEMODULATOR

George John Kustka, Matawan, and Kurt Hugh Mueller, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 16, 1976, Ser. No. 649,716
Int. Cl.² H03K 9/04
U.S. Cl. 329—107 8 Claims



1. A demodulator for a four-phase differentially coherent phase-shift-keyed data signal modulating a carrier wave of frequency f_c and having a synchronous baud interval T comprising

means for delaying received data signals by the baud interval T respectively increased and decreased by the reciprocal of $8f_c$;

first and second means for correlating in pairs signals obtained from said delaying means respectively delayed by the baud interval T minus, and the baud interval T plus, the reciprocal of $8f_c$ to form first and second correlation signals A and B;

third means for correlating signals A and B from said first and second correlating means to form a third correlation signal C;

first and second reversible counting means individually responsive to said first and second signals A and B with respect to counting direction and alternatively to said third signal C with respect to counting inhibition or enablement;

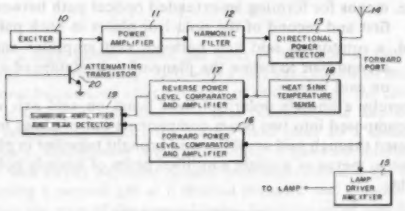
first and second bistable circuit means responsive to the sign of the accumulated counts of said first and second counting means at the end of each baud interval T; and

means for resetting each of said first and second counting means to a reference condition at the end of each baud interval T.

4,019,150
PA PROTECTION CIRCUIT FOR A SINGLE SIDEBAND RADIO

Daniel Morris Lurey, Hoffman Estates, and David Michael Drury, Mundelein, both of Israel, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 17, 1975, Ser. No. 632,542
Int. Cl.² H03G 3/20
U.S. Cl. 330—2 8 Claims



1. A protection circuit for a power amplifier used in a single sideband transmitter to supply RF power modulated with an audio signal to an antenna and wherein said power varies with the power of the audio signal, said protection circuit comprising:

a. directional power detector means coupled between the power amplifier and the antenna and having a first output for providing thereon a first audio frequency signal varying in accordance with the modulating audio signal and indicative of forward power supplied to the antenna and a second output for providing thereon a second audio frequency signal varying in accordance with the modulating audio signal and indicative of reflected power from the antenna;

b. first level comparator means coupled to the first output of said directional power detector means and providing an output signal varying in accordance with the first audio frequency signal applied thereto about a predetermined level;

c. second level comparator means coupled to the second output of said directional power detector means and providing an output signal varying in accordance with the second audio frequency signal applied thereto about a predetermined level;

d. summing means coupled to said first and second level comparator means for receiving the output signals therefrom and providing an output signal indicative of the sum thereof;

e. peak detector means coupled to said summing means for receiving the output signal therefrom and providing a DC potential at an output thereof which is proportional to the

magnitude of the output signal from said summing means; and

f. attenuating means having a control input coupled to said peak detector means and an output coupled to the power amplifier for reducing the amplitude of signals supplied to the power amplifier in accordance with the DC potential at the output of said peak detector to control peak envelope power at the antenna.

4,019,151

MULTIPLE PASS LASER AMPLIFIER SYSTEM

Keith A. Brueckner; Siebe Jorna, both of La Jolla, Calif., and N. Kent Moncur, Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Apr. 26, 1974, Ser. No. 468,176
Int. Cl.² H01S *3/00*
U.S. Cl. 330—4.3 **20 Claims**

1. An optical system for use in a lasing system which comprises:

a. a laser amplifier on a defined optical axis,

b. a pair of polarizer plates on said axis on each side of said amplifier,

c. means for forming an extended optical path between the first and second of the polarizer plates in each pair, and

d. a rotator on said axis between said amplifier and said second pair to rotate the plane of polarization of a beam on said axis,

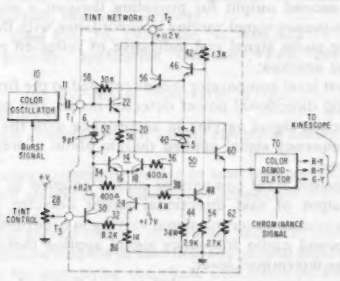
whereby a linearly polarized light beam on said axis will be decomposed into two beam components out of phase in time, passed through said amplifier and brought together in phase in time to merge as a single amplified beam of linearly polarized light.

4,019,152

BIAS CIRCUIT FOR JUNCTION DIODES

Leopold Albert Harwood, Somerville, and Erwin Johann Wittmann, North Plainfield, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,491
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **10 Claims**



6. A variable phase control circuit comprising:

a source of signals;

a phase shift network having an input coupled to said source and an output, and including a semiconductor device having a PN junction exhibiting a capacitance thereacross when reverse biased;

an amplifier having an input terminal coupled to said phase shift network output and an output terminal coupled to said source of signals;

variable control means coupled to said amplifier, for varying the amplifier gain and for thereby varying the amplitude of phase shifted signals provided at said output terminal;

a load impedance coupled to said output terminal for combining signals from said source and said varying amplitude phase shifted signals to produce combined signals;

a bias network providing a substantially constant reference voltage having a magnitude less than the reverse conduction breakdown voltage of said PN junction; and

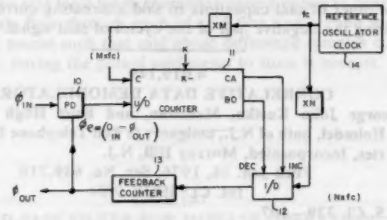
coupling means for applying said reference voltage to said device to reverse bias said junction, thereby determining said capacitance and inhibiting operation of said device beyond said reverse breakdown voltage in the presence of applied voltages having a magnitude tending to cause said operation.

4,019,153

DIGITAL PHASE-LOCKED LOOP FILTER

Duncan B. Cox, Jr., Manchester, and William H. Lee, Boston, both of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Oct. 7, 1974, Ser. No. 512,733
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 A **45 Claims**



36. A device comprising

phase detector means responsive to a first signal having a first phase and to a second signal having a second phase for producing a phase detected output signal representing the magnitude of the phase difference between said first and second phases;

digital integrating means responsive to a first clock signal and to said phase detected output signal for digitally integrating said phase detected output signal to generate a first control signal whenever the digitally integrated magnitude of said phase difference reaches a first preselected level and to generate a second control signal whenever the digitally integrated magnitude of said phase difference reaches a second preselected level; and

means responsive to a second clock signal and to said first and second control signals for producing a controlled clock output signal, the number of pulses of said clock output signal being controlled in accordance with the generation of said first and said second control signals.

4,019,154

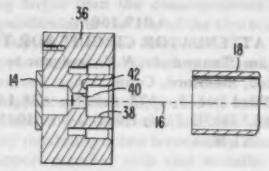
LIGHTNING ROD MIRROR PROTECTION

Gerald C. Barker, Palo Alto, Calif., assignor to Coherent Radiation, Palo Alto, Calif.

Filed Oct. 31, 1975, Ser. No. 627,714
Int. Cl.² H01S *3/02*
U.S. Cl. 331—94.5 T **7 Claims**

1. An improved laser device of the type having resonator mirrors defining an optic path and spaced apart cathode and anode electrodes intermediate the mirrors and aligned along

the optic path, wherein the improvement comprises electrically conductive means extending adjacent the optic path from the mirror closest to the cathode towards the cathode for



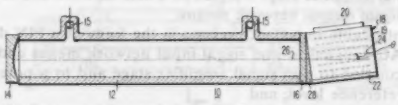
conveying electrical discharges from the cathode to the closest mirror, whereby electrical discharges between the cathode and the closest mirror are nondestructively conducted thereto.

4,019,155

ACOUSTO-OPTIC MODULATED LASER

Istvan Gorog, and Joseph Dale Knox, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,087
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 M 9 Claims



1. A gas discharge device for generating a modulated laser beam comprising:

a tube containing an active lasing gas and having means for creating a population inversion in the lasing gas, a spherical mirror and a partially reflective flat mirror at opposite ends of the tube for generating a laser beam; and

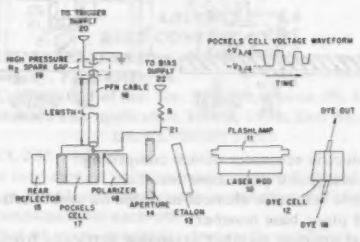
an acousto-optic modulator having a transducer for transmitting an acoustic wave through the modulator, the modulator being attached to the flat mirror so that the flat mirror is between the modulator and the tube.

4,019,156

ACTIVE/PASSIVE MODE-LOCKED LASER OSCILLATOR

William D. Fountain, Fremont, and Bertram C. Johnson, Palo Alto, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 2, 1975, Ser. No. 636,864
Int. Cl.² H01S 3/098
U.S. Cl. 331—94.5 ML 3 Claims



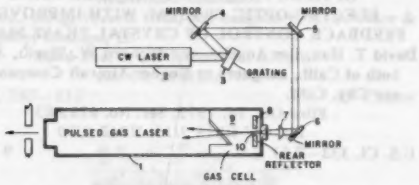
1. A Q-switched/mode-locked laser oscillator including an optical resonant cavity employing simultaneous active and passive loss modulation within the optical cavity comprising: a lasing medium positioned intermediate and in axial alignment with a rear reflector and a flowing dye cell/output reflector assembly, means for pumping said lasing medium positioned adjacent thereto, a Pockels cell and a linear polarizer positioned intermediate said lasing medium and said rear reflector and axially aligned therewith, means for controlling said Pockels cell operatively connected therewith, and an aperture forming member and an etalon positioned intermediate and aligned with said polarizer and said lasing medium.

4,019,157

METHOD AND APPARATUS FOR TUNING HIGH POWER LASERS

Donald P. Hutchinson, Knoxville, and Kenneth L. Vandersluis, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 6, 1976, Ser. No. 674,262
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 C 6 Claims



1. In a high power pulsed gas laser of the type having an optically resonant cavity filled with a first gas capable of lasing at natural frequencies characteristic of said first gas, the cavity being bounded at one end by a rear reflector, the improvement comprising means for tuning said laser to a desired frequency, said tuning means including a gas cell mounted within said cavity adjacent to said rear reflector, said gas cell containing a second gas at a desired pressure and capable of reducing the gain of the natural lasing frequencies of said first gas; a second low power laser adapted to be operated at said desired frequency; a focusing lens; said rear reflector provided with a small centrally positioned hole with a desired diameter; and means for directing the output of said second laser through said focusing lens and through said rear reflector hole into said gas cell and cavity, whereby said second laser acting in conjunction with said gas cell in said high power laser effects the tuning of said high power laser to said desired frequency of said second laser without the loss of power in the output of said high power laser.

4,019,158

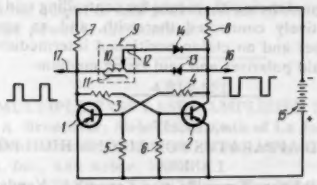
ASYMMETRICAL TRANSISTORIZED MULTIVIBRATOR WITH INDUCTIVE TIMING CIRCUITS

Sergei Nikolaevich Bazhenov, ulitsa Pushkinskaya, 32, kv.4, and Efim Mordukhovich Belyavsky, ulitsa Tonkopiya, 8b, kv. 115, both of Kharkov, U.S.S.R.

Filed May 22, 1975, Ser. No. 579,819
Int. Cl.² H03K 3/282
U.S. Cl. 331—113 R 3 Claims

1. An asymetrical transistorized multivibrator comprising: inductive timing circuits; a flip-flop; a first transistor of said flip-flop; a second transistor of said flip-flop; resistors of said flip-flop connected to said first and second transistors; a power source; a first load resistor whose first lead is connected to the collector of said first transistor, its second lead being connected to a respective pole of said power source; a second load resistor whose first lead is connected to the collector of said second transistor, its second lead being connected to a respective pole of said power source; a saturable reactor of

said timing circuit; a winding of said saturable reactor having two leads and a tap from a portion of turns of said winding, said first lead of said winding being connected to the collector of said first transistor; a first diode connected between said



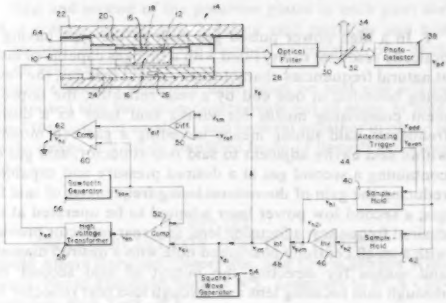
second lead of said winding and the collector of said second transistor; a second diode connected in opposition to said first diode, between the collector of said second transistor and said tap of said winding of said saturable reactor.

4,019,159

OPTICAL FREQUENCY DOUBLER USING ELECTRO-OPTIC CRYSTAL WITH IMPROVED FEEDBACK CONTROL OF CRYSTAL PHASE MATCH

David T. Hon, Los Angeles, and Richard W. Wyeth, Agoura, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 14, 1975, Ser. No. 621,883
Int. Cl.² H01S *3/13*; H04B *9/00*
U.S. Cl. 332—7.51 **9 Claims**



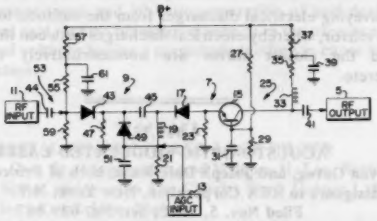
1. An optical frequency doubling arrangement comprising:
an oven including a heater element;
a crystal of electro-optic material mounted in said oven and positioned to receive an input beam of light at a predetermined frequency, said crystal being oriented to convert said input light beam into an output light beam having a component at twice said predetermined frequency; and
feedback control means responsive to the magnitude of said component at twice said predetermined frequency and to the temperature within said oven for controlling the indices of refraction of light in said electro-optic crystal to provide maximum conversion of light to said component at twice said predetermined frequency, said feedback control means including:
means for providing a first electrical signal indicative of the magnitude of said component at twice said fundamental frequency;
means for deriving from said first electrical signal a second electrical signal indicative of a continuing change in the magnitude of said component at twice said fundamental frequency;
means responsive to said second electrical signal for applying an electric field across said crystal of a magnitude determined by said second electrical signal;
means for providing a third electrical signal indicative of the temperature within said oven; and
means responsive to the sum of said second and third electrical signals for controlling said heater element.

4,019,160

SIGNAL ATTENUATOR CIRCUIT FOR TV TUNER

George H. Kam, Tonawanda, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 5, 1975, Ser. No. 638,144
Int. Cl.² H03H *7/24*; H03G *3/00*; H04N *5/52*
U.S. Cl. 333—81 R **7 Claims**



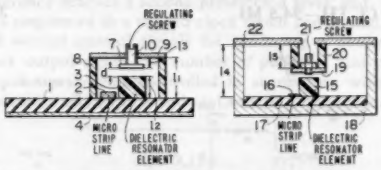
1. TV tuner attenuator circuit comprising:
signal input and output network means;
signal amplifier stage coupled to a bias network and to said signal output network means;
controllable impedance means in the form of a PIN diode AC coupled to said signal input network means and DC coupled to said signal amplifier stage and to a potential reference level; and
control signal means DC coupled to said controllable impedance means for altering current flow through said signal amplifier stage and controllable impedance means in a direction opposite to the direction of change of said applied signal whereby gain reduction of said signal amplifier stage and increased impedance of said controllable impedance means are combined to non-linearly attenuate an increase in applied signals.

4,019,161

TEMPERATURE COMPENSATED DIELECTRIC RESONATOR DEVICE

Katsuhiro Kimura, Tokyo, and Yoichi Kaneko, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 2, 1975, Ser. No. 609,603
Claims priority, application Japan, Sept. 2, 1974, 49-99949
Int. Cl.² H01P *7/04*
U.S. Cl. 333—82 B **3 Claims**



1. A dielectric resonator device comprising:
a micro-integrated plane base member;
a dielectric resonator element mounted on said micro-integrated plane base member;
a vertical support member extending vertically from said micro-integrated plane base member;
a frequency regulating screw for manually regulating the resonant frequency of said device, rotatably attached to

said vertical support member adjacent said dielectric element; and

a metallic plate, mounted on said screw and having a planar surface facing an upper surface of said dielectric resonator element, the size of the planar surface of said metallic plate being larger than the cross-sectional area of the screw perpendicular to the axis of the screw; and wherein

said vertical support member comprises

a first support member extending vertically from said base member, and

a second support member supported by said first support member above said base member, and wherein

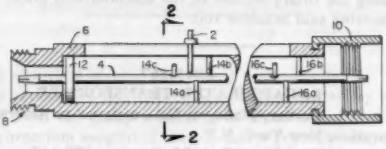
said frequency regulating screw is rotatably attached to said second support member with said metallic plate being affixed to the lower end of said screw, and

said first support member is made from Teflon pipe and said second support member is made from a metallic disc.

4,019,162
COAXIAL TRANSMISSION LINE WITH REFLECTION COMPENSATION

Harmon W. Banning, Derwood, Md., assignor to Weinschel Engineering Company, Gaithersburg, Md.

Filed Aug. 11, 1975, Ser. No. 603,703
Int. Cl.² H01P 3/06, 5/04; G01R 25/02
U.S. Cl. 333—96 17 Claims



1. a. A coaxial transmission line comprising

b. a rigid hollow outer conductor,

c. a rigid inner conductor centrally located within the hollow outer conductor, said inner conductor having an outer surface,

d. support means for rigidly supporting the inner conductor within the outer conductor comprising spaced dielectric pins extending radially between said conductors and which separately engage said inner conductor, and

e. means for reducing wave reflections of at least one of said pins comprising a depressed area, in said outer surface, of said inner conductor, said depressed area being located in the same lateral plane of the inner conductor as said one pin and constituting a shallow depression in the outer surface of the inner conductor and extending longitudinally along said inner conductor, said depressed area extending laterally away from the pin for a distance which is small as compared to the periphery of the inner conductor and being dimensioned to produce an inductive effect tending to compensate for the capacitive effect of the dielectric pin.

4,019,163
REED CONTACT UNIT

Alan R. Beavitt, Towcester, England, assignor to Square D Company, Park Ridge, Ill.

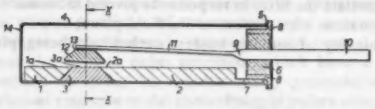
Continuation of Ser. No. 557,210, March 10, 1975, abandoned. This application Feb. 5, 1976, Ser. No. 655,589
Int. Cl.² H01H 51/28
U.S. Cl. 335—154 7 Claims

1. A reed contact unit comprising a pair of aligned members of magnetizable and electrically conductive materials spaced apart endwise from each other;

a fillet of a non-magnetic electrically conductive material inserted between the spaced ends of the members with a surface of the fillet and of each of the members co-planar to thereby provide a continuous contact surface;

a resilient cantilever mounted to be electrically independent of the members;

a magnetizable armature secured to the free end of the cantilever and positioned to move and make contact with the contact surface and complete an electrical circuit



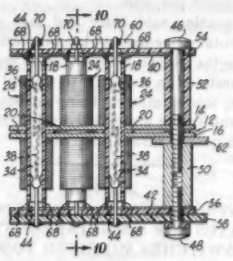
through the cantilever to the members upon magnetization of the members;

a non-magnetic stop member positioned to limit movement of the armature upon breaking of the electrical circuit to thereby minimize oscillation with the stop member electrically insulated from the members.

4,019,164
MEMORY MATRIX

Wyman L. Deeg, Vernon Hills, Ill., assignor to C. P. Clare & Company, Chicago, Ill.

Filed Dec. 3, 1975, Ser. No. 637,389
Int. Cl.² H01H 67/14
U.S. Cl. 335—112 18 Claims



1. A cross point switching matrix comprising:

a magnetic shunt plate having a plurality of apertures defined therein;

a plurality of reed switches disposed in said apertures and extending through said shunt plate; and

a pair of magnetic coupling plates disposed on opposite sides of said shunt plate, said magnetic coupling plate having a plurality of apertures defined therein and flanges extending from said apertures, said flanges being disposed in close proximity to the ends of said reed switches for magnetically coupling said reed switches together.

4,019,165
MINIATURE RELAY DEVICE

William W. Wright, Wheaton, Ill., assignor to Guardian Electric Manufacturing Company, Chicago, Ill.

Filed Sept. 8, 1975, Ser. No. 611,180
Int. Cl.² H01H 45/04
U.S. Cl. 335—126 11 Claims

1. An improved miniature relay construction comprising, in combination:

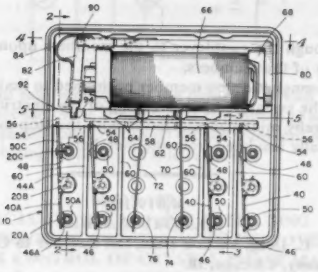
a housing with a base, said base including a plurality of contact pins encapsulated therein and projecting in opposite directions to the exterior and to the interior of the housing;

a coil assembly mounted in the housing, said assembly including a coil with a longitudinal axis, a fixed core in the coil, a field piece having an armature attached thereto by an attached armature spring, said armature pivoted at one

end to the field piece and biased by said spring away from said core;

a movable lifter in the housing generally adjacent to and parallel to the axis of the coil and translatable freely in said parallel direction, said lifter retained against substantial movement in other directions, the opposite end of said armature being drivingly connected to the lifter to translate the lifter in response to pivotal movement of the armature with respect to the field piece;

a plurality of moving blades, each blade being pivotally



mounted on a separate pin for rotation in either direction and having a contact affixed to at least one end thereof, each end being cooperative with another separate associated contact pin; and

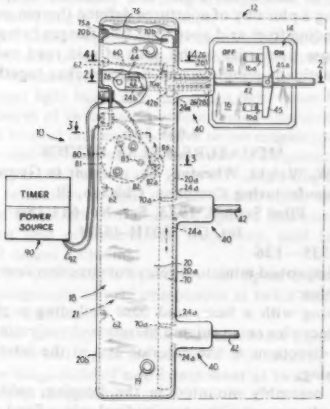
means connecting said lifter and said moving blades to effect pivotal movement in both directions of each of the blades on the pin on which each is mounted, said lifter being translated in response to pivotal movement of the armature, said armature being pivoted away from the core by the spring and toward said core when sufficient current is passed through the coil.

4,019,166

TIMER CONTROLLED ELECTROMAGNETIC TRIPPING APPARATUS FOR SIMULTANEOUSLY CLOSING PLURAL SWITCHES MOUNTED TO PANELBOARD

Robert J. Lawrence, Dix Hills; John Devaney, Massapequa Park, and Dominick Tramontano, East Islip, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,034
Int. Cl.² H01H 9/00, 3/00
U.S. Cl. 335—172 **10 Claims**



1. A switching device for use with a switch panel having a plurality of lever type switches therein comprising:

housing means adapted to be mounted on the panel adjacent the switches; a plurality of trip assemblies, each assembly including a trip rod slidably mounted in said housing and extending outwardly therefrom parallel to the throw path of the associated panel switches; switch lever engaging means coupled to said trip rod, said trip rod being movable through a throw distance corresponding to the ON-OFF throw of said switch lever; spring means mounted in said housing for biasing said trip rod to the OFF position; flexible detent means located within said housing having one portion normally engaging the trip rod and blocking the movement thereof in the OFF direction, and said one portion being movable to a non-blocking position, whereby said trip rod may move in the OFF direction under the influence of said spring means, each trip rod and engaging means being movable conjointly with their associated switch lever, when the switch lever is manually moved to the ON position; and an elongate actuator rod slidably mounted in said housing and traversing each detent means, said actuator rod including a detent engaging member for each flexible detent; and means for moving said actuator rod longitudinally to cause said detent engaging member means to flex each detent means whereby said one portion of the detent means is moved to a non-blocking position and each rod is biased to the OFF position.

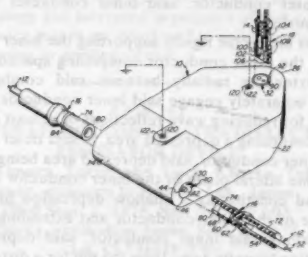
8. The device of claim 1, wherein said actuator rod moving means includes a rotary solenoid, and linkage means for transforming the rotary motion of the solenoid into linear motion for moving said actuator rod.

4,019,167

ENCAPSULATED TRANSFORMER

Kenneth L. Barker, Flanders, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed May 19, 1975, Ser. No. 579,117
Int. Cl.² H01F 15/10, 27/04
U.S. Cl. 336—96 **13 Claims**



1. An encapsulated transformer having a core and coil assembly with primary and secondary windings, and having a watertight construction suitable for burial, immersion in water, an for use under a relatively wide range of temperature variations, wherein the improvement comprises:

a. a unitary jacket surrounding the core and coil assembly, for resisting rough handling, accommodating the temperature variations without fracture, and for providing the watertight encapsulation of the transformer; and

b. a plurality of recesses in said jacket defining a corresponding plurality of separable external circuit connections, at least one of said external circuit connections comprising a first electrical contact member and a second complementary electrical contact member, said first contact member and said second complementary contact member each having means engageable with one another, one of said engageable means comprising a detent element adapted for engagement with the other of said engageable means, said one engageable means further including resilient means, which resilient means biases

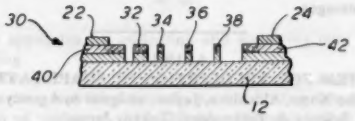
the detent element at an acute angle to the longitudinal axis of its corresponding contact member, whereby said acute angle is of sufficient magnitude to capture said other engageable means against release by a force greater than the force necessary to cause mutual engagement of said one and said other engageable means, and wherein said first contact member comprises a pin member, and said other engageable means comprises a groove on said pin member, said groove adapted to receivably engage said detent element, and said second complementary contact member comprises an electrical socket including said one engageable means, said electrical socket adapted to receivably engage said pin member.

4,019,168

BILAYER THIN FILM RESISTOR AND METHOD FOR MANUFACTURE

Franklyn M. Collins, Lewiston, N.Y., assignor to Airco, Inc., Montvale, N.J.

Filed Aug. 21, 1975, Ser. No. 606,399
Int. Cl.² H01C 1/012
U.S. Cl. 338—309 **15 Claims**



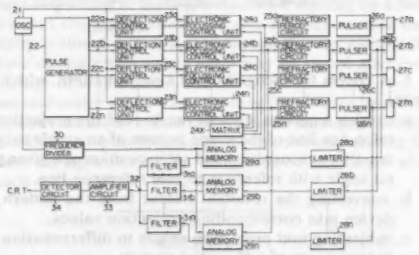
1. An electrical resistor comprising a non-conductive substrate, a conductive thin film of a chromium containing alloy selected from the group consisting of nickel-chromium and cobalt-chromium supported thereby and a protective layer of tantalum oxide directly thereover and contiguous therewith.

4,019,169

ULTRASONIC WAVE TRANSMITTING AND RECEIVING APPARATUS

Kinya Takamizawa, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 24, 1975, Ser. No. 616,390
Claims priority, application Japan, Sept. 30, 1974, 49-111626
Int. Cl.² G01S 9/66
U.S. Cl. 340—1 R **10 Claims**



1. An ultrasonic transmitting and receiving apparatus comprising

a plurality of electro-acoustic conversion elements arranged in line;

a plurality of driving pulsers for supplying high voltage driving pulses to the electro-acoustic conversion elements to permit them to generate ultrasonic beams;

a plurality of electronic focussing control units for energizing the driving pulsers in a predetermined time relation in order to focus the ultrasonic beams;

a clock pulse generator for generating fundamental clock pulses;

a control pulse generator having a plurality of output terminals for sequentially generating control output pulses through the output terminals with equal delay times which are cyclically varied in a digital format;

a plurality of deflection control units for deflecting the ultrasonic beams which are generated to correspond with the output terminals of the control pulse generator to generate output pulses in response to the control pulses from the control pulse generator which have a delay function in order to simultaneously generate output pulses in response to the control output pulses seqentially generated from the control pulse generator with a desired delay time which may be cyclically varied in order to determine a deflection center, the output pulses from the deflection control units being supplied to the electronic focussing control units, respectively; and

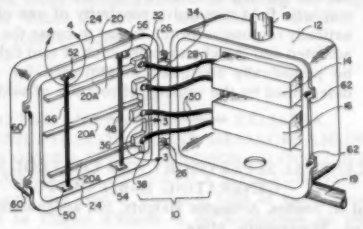
a plurality of memory units corresponding to the electro-acoustic conversion elements adapted to receive, as write-in signals, signals obtained from the electro-acoustic conversion elements when the ultrasonic beams are reflected from an object and to read out the write-in signals at the same intervals as the output pulses generated by the electronic focussing control units.

4,019,170

ADAPTER UNIT FOR PEDESTRIAN TRAFFIC CONTROL SIGNAL

James S. Gould, Los Alamitos, and Samuel Gould, Los Angeles, both of Calif., assignors to Indicator Controls Corporation, Gardena, Calif.

Filed Dec. 10, 1975, Ser. No. 639,267
Int. Cl.² E01F 9/00
U.S. Cl. 340—119 **6 Claims**



1. In combination: a pedestrian traffic control signal including a casing and a frame-like cover hinged to the casing, and at least one transformer mounted in said casing; a signal illuminating capsule having a tray-like configuration mounted in said cover, said capsule having a planar lens member enclosing the front face thereof, and having electrodes mounted on the rear face thereof; electrical leads connected to said electrodes and to the transformer to establish electrical connection with the transformer; a plurality of brackets affixed to said cover at the edges thereof; and the ends of at least one bar releasably clipped into said brackets extending across and bearing against the rear face of the capsule to retain the capsule in said cover.

4,019,171

SAFETY LIGHTING SYSTEM

Ronald G. Martelet, River Forest, Ill., assignor to Sears, Roebuck and Co., Chicago, Ill.

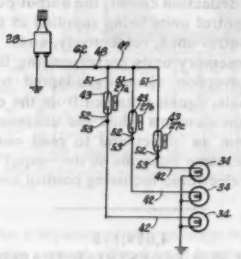
Filed Dec. 16, 1974, Ser. No. 532,917
Int. Cl.² B62J 5/00
U.S. Cl. 340—134 **1 Claim**

1. An improved speed responsive lighting system for a cycle having a spoked wheel rotatable at a velocity relative to the

speed of the cycle, said wheel being journalled for rotation in a supporting member of said cycle which is disposed in a plane adjacent to the spokes of the wheel and which extends substantially radially from the center of the wheel, said system comprising:

a. a plurality of warning light means mounted in a unitary bracket mounted on said cycle with the light means being rearwardly directed,

b. a plurality of magnetically responsive switch means mounted in aligned relationship in an integral housing with said housing being mounted on said cycle in parallel relation to said supporting member adjacent a plurality of spokes of said wheel and being operatively coupled to said warning light means,



c. and a plurality of magnetic field generating means mounted on equiangularly spaced spokes of said wheel,

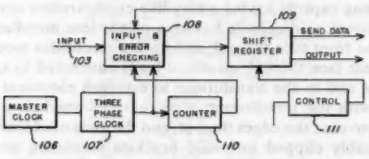
d. each of said magnetic field generating means being spaced radially from the center of the wheel a distance corresponding to the distance of a respective one of each of the magnetically responsive switch means from the center of the wheel whereby upon rotation of the wheel each of the magnetic field generating means passes within magnetic field responsive proximity of one of said magnetically responsive switch means to cause the latter to be actuated and thereby to cause each of said light means to be periodically energized in sequence for an interval determined by the velocity of rotation of said wheel.

4,019,172

CENTRAL SUPERVISORY AND CONTROL SYSTEM GENERATING 16-BIT OUTPUT

Paul G. Srodes, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 19, 1976, Ser. No. 650,229
Int. Cl.² G08B 29/00
U.S. Cl. 340—146.1 C **20 Claims**



1. A communication system wherein a central processing means and a plurality of remote stations transmit and receive messages to and from each other over a common transmission channel, said messages constructed of a plurality of bits, said system comprising:

central processing means having processing means and universal asynchronous receiver transmitter means comprising,

bit means for generating a plurality of bit signals each corresponding to a bit of a message received from said plurality of remote stations,

error means for generating an error signal having a state dependent upon whether there is an error in the transmission of messages from said plurality of remote stations, and

busy means for generating a busy signal having a state dependent upon whether the universal asynchronous receiver transmitter means is busy;

said central processing means further comprising,

bit output means connected to receive such bit signals for generating bit outputs,

error output means connected to receive said error signal for generating an error output,

busy output means connected to receive said busy signal for generating a busy output, and

no response means responsive to said messages from said remote states for generating a no response signal having a state dependent upon whether or not a message is received from a remote station within a predetermined time;

said processing means for receiving substantially simultaneously said bit outputs, error output, busy output and no response output for reading said outputs in one operation;

transmission channel means connected to said central processing means; and

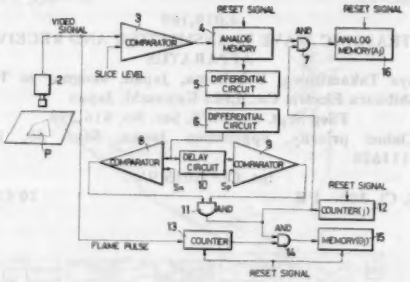
a plurality of remote stations each connected to said transmission channel means for receiving and transmitting messages.

4,019,173

SYSTEM FOR RECOGNITION OF SHAPE PATTERNS

Hidehiko Kono, Akishima, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Continuation-in-part of Ser. No. 594,040, July 8, 1975, abandoned. This application June 9, 1976, Ser. No. 694,382
Claims priority, application Japan, July 8, 1974, 49-78003
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 AE **3 Claims**



1. A system for recognition of a shape pattern, which comprises

a. causing a pattern input device to read the projection on a reference line of the shape pattern of an article subjected to pattern recognition and set in position at a given postural angle with reference to said reference line,

b. converting the resultant output from the pattern input device into corresponding projection values,

c. subjecting said projection values to differentiation twice in two stages of differential circuits,

d. continuing the whole procedure described in steps (a), (b) and (c) until the rotation thereof covers one complete circle,

e. detecting the fact that each side of the polygon of the shape pattern has fallen exactly into the direction of projection in accordance with the change in the initial value of the output from said differential circuits,

f. putting to memory the rotary postural angle of the shape pattern and the projection value existing at the time of said detection and

g. accomplishing the recognition of shape pattern on the basis of the rotated postural angle and the projection value obtained as described above.

4,019,174

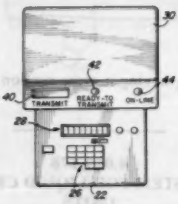
DATA COLLECTING AND TRANSMITTING SYSTEM

James L. Vanderpool, Centerville, and Dennis J. Hoertt, Dayton, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation of Ser. No. 205,810, Dec. 8, 1971. This application Sept. 17, 1973, Ser. No. 397,945

Int. Cl.² G06F *3/14*

U.S. Cl. 340—172.5 15 Claims



1. An apparatus for collecting and supplying data entries comprising

a dynamic circulating data storage means providing time slots in a repetitive time frame for storing data entries, each of said time slots defining a time at which a data entry may be stored and withdrawn from the data storage means,

input means for supplying data entries to the storage means,

output means for withdrawing data entries from the storage means,

a pair of counters each operable synchronously with the circulating data storage means, one of said counters providing a load signal representing a first time slot when said one counter reaches a predetermined count value and the other of said counters providing an output signal representing a second time slot when said other counter reaches a predetermined count value,

a pair of control circuits, one control circuit being controlled by the load signal and coupled to the input means for initiating the storage of a data entry into the storage means during the first time slot and the other control circuit being controlled by the output signal and coupled to the output means for initiating the withdrawal of a data entry from the storage means during the second time slot.

means responsive to the input means for altering by a fixed amount the count within said one counter as each data entry is stored in the storage means, thereby altering the time during which a data entry may be stored after each storage of a data entry, and

mens responsive to the output means for altering by a fixed amount the count in said other counter as each data entry is withdrawn from the storage means, thereby altering the time during which a data entry may be withdrawn after each withdrawl of a data entry.

4,019,175

PROGRAM CHANGEABLE SEQUENCE CONTROLLER

Hisaji Nakao, Toyota; Yasufumi Tokura, Kariya; Kazuo Matsuno, Okusa, and Toshihiko Yomogida, Kariya, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha and Toyota Jidosha Kogyo Kabushiki Kaisha, both of, Japan

Filed Apr. 15, 1975, Ser. No. 568,249

Claims priority, application Japan, Apr. 18, 1974, 49-43652

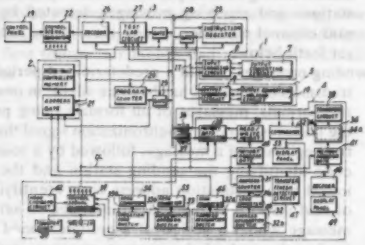
Int. Cl.² G05B *19/18*

U.S. Cl. 340—172.5 16 Claims

1. A program input device for a programmable sequence controller having controller memory means capable of removably containing at least one read-only memory for storing a sequence program comprising a series of instructions, input means for selecting external inputs connected thereto in accordance with the instructions, operation control means for examining the selected external inputs in accordance with the instructions, and output means for selectively operating external outputs connected thereto in accordance with the instructions and with the results of the examinations, the program input device comprising:

a read-write memory capable of storing the sequence program,

connecting means connectible to the read-only memory removed from the controller memory means,



program transfer means coupled to the read-write memory and the connecting means for transferring the sequence program from the read-only memory to the read-write memory in a first transfer mode and from the read-write memory to the read-only memory in a second transfer mode,

program changing means for changing the sequence program loaded into the read-write memory, and

switchable mode changing means for causing the program transfer means to operate selectively in the first and second transfer modes.

4,019,176

SYSTEM AND METHOD FOR RELIABLE COMMUNICATION OF STORED MESSAGES AMONG STATIONS OVER A SINGLE COMMON CHANNEL WITH A MINIMIZATION OF SERVICE MESSAGE TIME

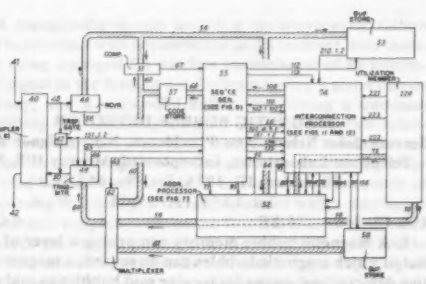
Jean M. Cour, and Jean F. Suchard, both of Paris, France, assignors to Centre d'Etude et de Realisation en Informatique Appliquee - C.E.R.I.A., Paris, France

Filed June 19, 1975, Ser. No. 588,497

Claims priority, application France, June 21, 1974, 74.21717

Int. Cl.² G06F *3/04*; H04J *3/04*, *3/08*, *3/06*

U.S. Cl. 340—172.5 11 Claims



1. A method of communicating data among a plurality of mutually remote stations equipped for transmitting and receiving data signals at a rate within a predetermined tolerance

of a predetermined transmission rate on a common transmission channel through which a message transmitted by one station is made available for reception at all other stations of said plurality of stations without message storage delays at any intermediate station distinct from the sending station, comprising the steps of:

providing at all stations a looped list of all said stations, by address codes respectively individual to the several stations, in the same predetermined order;

locally storing data originating at any station and ready for transmission to any other station together with the identification of the latter addressee station;

observing the condition of the transmission channel at each station during desired periods of activity of the respective stations and receiving messages detected by observing said channel condition as specified in the receiving step set forth below;

sending messages, within a predetermined period after said transmission channel has become silent, in one of at least two formats, messages of all formats being preceded by the transmission of a synchronization signal that identifies the beginning of a message, followed by a source address code identifying the sending station and thereafter followed by a destination address code identifying another of said stations as the station intended to send the next message within a period of a predetermined length following the end of the current message, said first two formats including a first format in which said destination address code is followed by a data field corresponding to the data awaiting transmission at the sending station and a second format in which the message ends with the transmission of the destination address code;

determining the destination address code in messages of said first format in accordance with an addressee station identification supplied with data awaiting transmission, and

determining the destination address code in messages of said second format by selecting the next station on said looped list,

said step of sending a message being performed only within a period of said predetermined length following reception of a preceding message in which the destination code received was recognized as the station's own address code, except when the transmission channel has been silent for a period of a second predetermined length much longer than said first predetermined length,

receiving at least the control codes, source address codes and destination address codes included in messages detected when the station is not sending,

detecting destination address codes identifying the receiving station and as a preliminary to sending steps set forth above, and

receiving data fields of messages of the first format at least in the cases of messages of which the destination address code has been detected to be that of the receiving station.

4,019,177

MAGNETIC BUBBLE DETECTOR

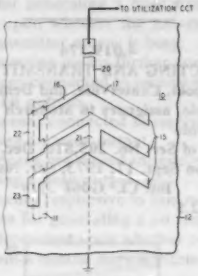
Terence John Nelson, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 10, 1976, Ser. No. 665,422

Int. Cl.² G11C *19/08*

U.S. Cl. 340—174 TF **4 Claims**

1. A magnetic bubble memory comprising a layer of material in which magnetic bubbles can be moved, a magnetoresistive detector and means for moving said bubbles to said detector, said detector comprising a plurality of chevron elements each having first and second legs, said elements being aligned along an axis transverse to the path of bubble movement, said chevron elements being interconnected by interlinking elements at an end and at about the apex of each into a single magnetoresistive element including said first leg therebetween, said first leg having a cross section reduced from that of said second leg.



4,019,178

CMOS DRIVE SYSTEM FOR LIQUID CRYSTAL DISPLAY UNITS

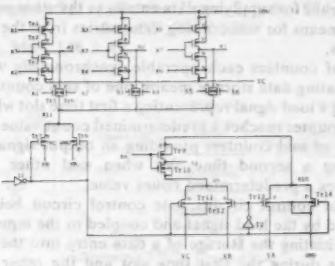
Shintaro Hashimoto, Nara, and Hirohide Nakagawa, Sakurai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 4, 1975, Ser. No. 565,269

Claims priority, application Japan, Apr. 5, 1974, 49-39336

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 M **3 Claims**



1. In a drive system for driving a liquid crystal unit including a common electrode, a plurality of segment electrodes, the combinations of which define display patterns, as well as liquid crystal composition between said common and said segment electrodes having a given threshold voltage value which initiates a change in the optical characteristics of said liquid crystal unit, said drive system being adapted to apply an alternating voltage higher than the threshold value to the liquid crystal unit when it is desired to be on, and to apply an alternating voltage higher than a reference potential but lower than the threshold value to the same when it it is desired to be off, an improvement comprising;

means for establishing first, second and third potential levels other than the reference potential, the potential difference between the third level and the reference level being selected higher than the threshold value and the potential differences of the first and second potential levels with respect to the reference level being lower than the threshold value;

means for applying to the common electrode an alternating voltage alternating between the reference level and the third level and for applying to the segment electrodes an alternating voltage which alternates between the reference level and the third level in a phase opposite to the alternating polarity voltage applied to the common electrode, when the liquid crystal unit is desired to be on; and

means for applying to at least one of the common electrode and the segment electrodes an alternating voltage which alternates between the first level and the second level, when the liquid crystal unit is desired to be off.

4,019,179
METHOD OF LOCATING PERSONS IN DISTRESS

Wilford Eugene Sivertson, Jr., Yorktown, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 27, 1976, Ser. No. 662,176
Int. Cl.² G01S 7/04, 9/02
U.S. Cl. 343—5 MM **4 Claims**

1. A method for locating any person in distress on a part of the surface of the earth who has deployed passive RF reflectors in a predetermined arrangement to indicate his distress situation comprising the steps of:

making a first transparency in the spatial frequency domain of an image of said RF reflectors in said predetermined arrangement;

scanning said part of the surface of the earth with a side-looking radar to produce images of said part of the surface of the earth;

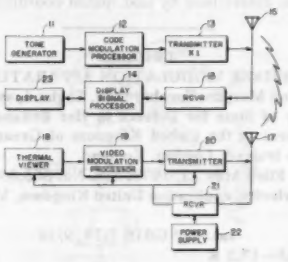
making second transparencies in the conventional image domain of said images produced by said radar; and

determining, from said first and second transparencies by complex spatial filtering, if said RF reflectors in said predetermined arrangement were deployed on said part of the surface of the earth when scanned by said radar.

4,019,180
REMOTE INFRARED SIGNAL COMMUNICATOR

Howard T. Graves, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 304,710, Nov. 8, 1972, abandoned. This application Nov. 17, 1975, Ser. No. 632,594
Int. Cl.² G01S 9/02, 9/64
U.S. Cl. 343—6 ND **2 Claims**



1. A surveillance system comprising:

a passive infrared viewer including at least one detector element supplying a video signal;

a first wireless transmitter means for transmission of a first carrier wave;

a first modulation circuit means coupling said viewer and said transmitter means for impressing the video image information from said detector means on the modulation envope of said first carrier wave;

a power supply;

a first receiver directly coupled to said power supply and tuned to a frequency band different from that of said first carrier wave to receive a second carrier wave and further including,

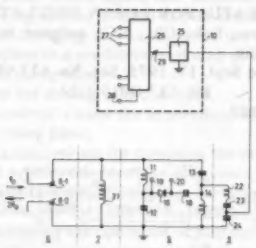
a demodulator circuit means to generate a gating pulse in response to a preselected frequency shift in said second carrier, and

a rachet type relay means activated by said gating pulse to connect and interrupt said power supply to said viewer, said first transmitter means and said first modulation means.

4,019,181
TRANSPONDER SYSTEM

Kjell Olow Ingemar Olsson, Jarfalla, and Bengt Georg Loggert, Solna, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 9, 1975, Ser. No. 594,206
Claims priority, application Sweden, July 19, 1974, 7409425
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 SS **7 Claims**

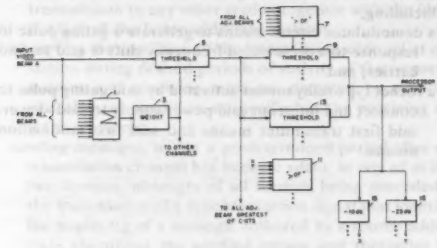


1. A transponder system including an interrogator station which is provided with a transmitter and a receiver, said transmitter being arranged for wireless transmission of an interrogation signal in the form of a pulse train having a given carrier frequency, and a responder station comprising a common transmitting and receiving antenna connected to two terminals, a first resonator connected between said terminals and tuned to the incoming carrier frequency, a second resonator connected between said terminals and tuned to a harmonic of the incoming frequency, a rectifier element with a non-linear characteristic coupled between the first and second resonators to produce d.c. trigger pulses from the incoming signal and to excite said second resonator for retransmitting a reply signal at the harmonic frequency, a modulator triggered by said d.c. pulses from the rectifier element an including control means for eliminating and restoring the resonant condition in said second resonantor in response to a binary information signal which is fed into the modulator.

4,019,182
RADAR SIGNAL PROCESSOR

Joseph DeLorenzo, Sudbury, Mass.; Julius V. DiFranco, Dix Hills, and Frank J. Scire, Huntington Staton, both of N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 14, 1973, Ser. No. 342,906
Int. Cl.² G01S 7/34
U.S. Cl. 343—7 A **3 Claims**

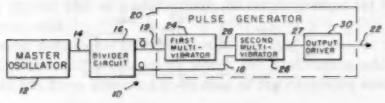


1. A processor in a multiple beam radar system having a plurality of beam signals physically located to each other in a rank and file pattern comprising a first threshold circuit having an input and an output; a first beam signal being fed to the input of the threshold circuit; a first means connected to said threshold circuit for setting the threshold level in accordance with a weighted amount of the average of all the beam signals; a second threshold circuit having an input and an output; the input of said second threshold circuit being connected to the output of said first threshold circuit; a first greater of circuit having a plurality of inputs and an output; each beam signal physically adjacent to said first beam signal being connected to individual ones of the inputs to said greater of circuit; and said first greater of circuit being connected to said second threshold circuit so as to set the threshold level thereof.

4,019,183
APPARATUS FOR LORAN SIMULATION

James R. Haynes, Lake City, S.C., assignor to Kayot, Inc., Mankato, Minn.

Filed Sept. 17, 1975, Ser. No. 613,992
Int. Cl.² G01S 1/24
U.S. Cl. 343—103 **5 Claims**



1. Solid state electronic apparatus for generating a simulated LORAN output signal for actuating and testing LORAN receivers, said apparatus comprising:

oscillator means for generating a primary signal having a predetermined frequency;

divider means for generating a Q trigger signal and a complementary Q trigger signal in response to said primary signal;

generator means for producing a simulated LORAN pulse slave signal in response to said Q trigger signal and a simulated LORAN pulse master signal in response to said Q trigger signal, said generator means comprising:

first multi-vibrator means responsive to said Q trigger signal for producing said simulated LORAN slave signal; and

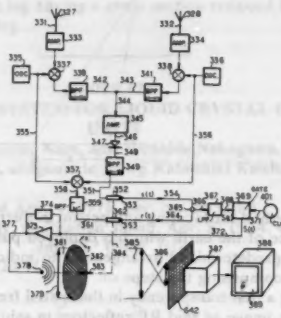
second multivibrator means responsive to said Q trigger signal for producing said simulated LORAN master signal; and

means for coupling said first multivibrator means to said second multivibrator means thereby combining said simulated pulse slave signal and said simulated pulse master signal thereby providing said simulated LORAN output signal.

4,019,184
DIRECTION-FINDING METHOD AND SYSTEM

Jacques A. Dorey, Combs-la-ville, France, assignor to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France

Filed Feb. 18, 1975, Ser. No. 550,481
Claims priority, application France, Feb. 20, 1974, 74.05808; Feb. 20, 1974, 74.05809; Feb. 20, 1974, 74.05810; Feb. 20, 1974, 74.05811; Feb. 20, 1974, 74.05812
Int. Cl.² G01S 5/02
U.S. Cl. 343—113 DE **42 Claims**



1. A method of obtaining information on the position of a first station relative to a second station, comprising the steps of:

sending out wave energy from a transmitting device at said first station;

intercepting said wave energy by a receiving device at a second station;

subjecting one of said devices to a continuous periodic motion;

deriving from the intercepted wave energy a periodic signal component dependent on two spatial coordinates determined by said relative position;

modulating a luminous flux with said signal component;

directing the modulated flux onto an optical filter with a two-dimensional transmissivity pattern varying periodically in one dimension; and

displacing said pattern with reference to the path of said modulated flux with a periodicity related to the period of said continuous motion whereby the intensity of the flux downstream of said pattern reaches an extreme value at a location determined by said spatial coordinates.

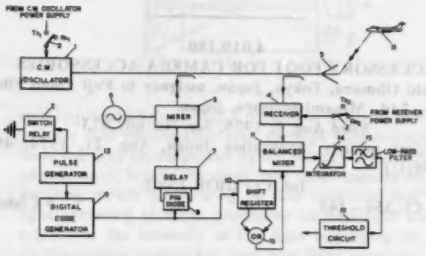
4,019,185
PHASE MODULATION APPARATUS

Arthur Picton Morgan, Farnborough, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed May 23, 1973, Ser. No. 365,090
Claims priority, application United Kingdom, May 30, 1972, 25344/72
Int. Cl.² G01S 7/28, 9/38
U.S. Cl. 343—17.2 R **7 Claims**

1. Phase modultion apparatus for an interrupted carrier-wave coherent radar comprising; carrier-wave generator means for generating a carrier-wave signal of a predetermined frequency during transmit periods and having signal output

means for connection to an aerial; transmit/receive switch means connected to a power supply control input of the carrier-wave generator means; pulse generator means connected to a control input of the transmit/receive switch means for producing alternately transmit pulses and receive pulses of predetermined and non-overlapping periods, each of said transmit pulses being operative to cause the transmit/receive switch means to switch on a power supply to the carrier-wave generator means for a transmit period and each of said receive pulses being operative to cause the transmit/receive switch means to switch off the power supply to the carrier-wave generator means for a receive period; a delay line coupled at one end to the signal output means of the carrier-wave generator means; reflector means at the other end of the delay line for reflecting



signals produced by the carrier-wave generator means during a transmit period and travelling in the delay line; and, modulation signal generator means connected to the reflector means and synchronously connected to the pulse generator means for controlling the reflecting actions of the reflector means so that signals travelling in the delay line are reflected with a phase-shift dependent on a modulation signal produced by the modulation signal generator means and arrive back at the signal output means substantially at but not after the commencement of the next transmit period, the phase of the reflected signal determining by injection phase-locking the phase of the carrier-wave signal produced by the carrier-wave generator means during a transmit period as compared with the phase of the carrier-wave signal produced during the preceding transmit period.

4,019,186

MOTION PICK-UP APPARATUS IN A NON-MECHANICAL PRINTER

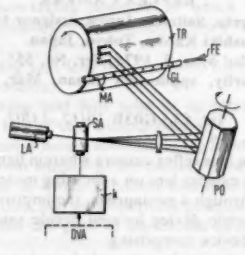
Anton Dressen, Dachau, and Klaus Menzel, Ebersberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 18, 1976, Ser. No. 668,125

Claims priority, application Germany, Mar. 20, 1975, 2512349

Int. Cl.² G01D 9/42, 15/10; G02B 5/14

U.S. Cl. 346—108 **5 Claims**



1. Motion pick-up apparatus for producing electronic timing signals in a non-mechanical character printer, comprising:

a light source operable to produce a laser beam;

beam deflection apparatus including an acousto-optical beam deflector for splitting the laser beam into a plurality of sub-beams in accordance with each of the characters to be pritned;

a data carrier;

a polygonal reflector for deflecting the sub-beams onto the data carrier at spaced locations for each character along a line of the data carrier;

a light transmissive rod disposed parallel to the line of print of the data carrier;

light scattering locations along said rod in the path of a predetermined sub-beam for scattering incident light for transmission through said rod; and

a light detector at one end of said rod for generating timing signals in response to the light reflected through said rod.

4,019,187

INK JET RECORDING APPARATUS

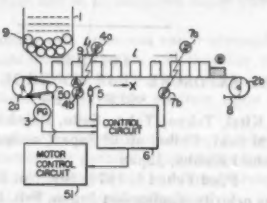
Hideyuki Ōmori, Hitachi; Yoshio Ouchi, Mito; Takatoshi Ikeda, and Toshio Tsubaki, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 17, 1976, Ser. No. 667,469

Claims priority, application Japan, Mar. 19, 1975, 50-32356

Int. Cl.² G01D 15/18; B41F 17/16

U.S. Cl. 346—75 **4 Claims**



1. An ink jet recording apparatus wherein information patterns are recorded on articles in the form of dot matrix by a recording head which ejects ink droplets in a direction toward recording surface of each of said articles conveyed by a conveyer as changing the direction of the ink droplets to apply the droplets to a predetermined area of the each article, said apparatus comprising:

drive means for driving said conveyer,

recording control means for controlling the operation of said recording head,

trouble detection means for detecting the movement of the recorded articles conveyed by said conveyer,

record completion detection means for detecting the completion of record for each of the articles, and

means for stopping the operation of said driving means and said recording control means under the presence of the output signals of said trouble detection means and said record completion detection means.

4,019,188

MICROMIST JET PRINTER

Frederick Hochberg, Yorktown Heights; William B. Pennebaker, Carmel, and Keith S. Pennington, Somers, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 12, 1975, Ser. No. 576,407

Int. Cl.² G01D 15/18

U.S. Cl. 346—75 **3 Claims**

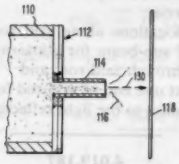
1. A micromist ink printing device comprising:

nozzle means having an aerosol chamber with an output port, said output port having an opening size in the order of up to about one millimeter;

nebulizer means for introducing a micromist of ink particles having a size of about 1 to 25 microns into said chamber;

pressure means for forcing said micromist of ink particles out through said output port in the form of an aerosol jet with a velocity that causes the micromist ink particles to be entrained in and focused around the axis of said aerosol jet and thereby print on a print medium a narrow width region which is substantially narrower in size than the opening size of said output port; and

particle velocity control means mounted on or forming part

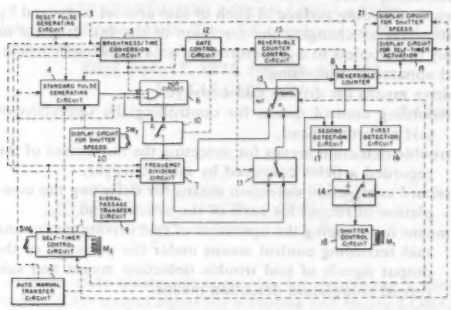


of an aerosol chamber wall for selectively introducing turbulence into said aerosol jet such that said aerosol particle velocity is insufficient to wet with said print medium, said particle velocity control means being activated during non-print cycles, said particle velocity control means comprising a piezoelectric transducer mounted on said aerosol chamber wall adjacent said output port, and said output port is formed by a tubular jet nozzle.

4,019,189
DIGITAL EXPOSURE TIME CONTROL CIRCUIT WITH SELF-TIMER

Kiyoshi Kitai, Tokyo; Takeo Saito, Dainichi Yotsukaido, and Youichi Seki, Chiba, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Feb. 14, 1975, Ser. No. 550,030
Claims priority, application Japan, Feb. 18, 1974, 49-19272
Int. Cl.² G03B *7/08, 9/64*
U.S. Cl. 354—23 D **1 Claim**

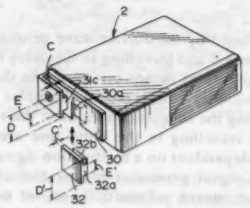


1. A digital exposure time control circuit comprising: a pulse generating circuit for generating standard pulses at a substantially constant rate; a dividing circuit for developing output pulses having a lower repetition rate than standard pulses applied thereto; brightness-time conversion circuit means connecting said pulse generating circuit to said dividing circuit and operable for applying to said dividing circuit a number of standard pulses inversely proportional to the brightness of a scene to be photographed, whereby the number of standard pulses are proportional to an exposure time; a reversible counter operable in a counting mode for counting pulses applied thereto and operable in a read-out mode for reading out the counted pulses to control an exposure time; means for applying dividing circuit output pulses to said reversible counter to count the dividing circuit output pulses when said reversible counter is operated in the counting mode; second means operable for applying standard pulses to said dividing circuit thereby to effect counting of dividing circuit output pulses by sid reversible counter when said reversible counter is operated in the counting mode; a self-timer control circuit responsive to the number of counted pulses for clearing said reversible counter, for disabling said second means for applying standard pulses to said dividing circuit, and for enabling said brightness-time conversion circuit means when the number of counted pulses exceeds a predetermined number which corresponds to a predetermined delay time, whereby said reversible counter counts the number of pulses proportional to an exposure time to control an exposure time after a delay determined by the time required to count the predetermined number of pulses to which self-timer control is responsive.

4,019,190
ACCESSORY FOOT FOR CAMERA ACCESSORIES

Hiroshi Ohmura, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 5, 1975, Ser. No. 602,073
Claims priority, application Japan, Aug. 21, 1974, 49-99688[U]
Int. Cl.² G03B *15/05*
U.S. Cl. 354—145 **5 Claims**



1. An accessory foot fixed to an accessory for cameras to be engaged with an accessory shoe fixed to the body of cameras comprising a base fixed to the accessory, said base extending along the bottom face of the accessory, a standardized foot part fixed to said base and having a main portion spaced from and extending in a direction parallel to said base, said standardized foot part having an electric synchronizing contact to be put into contact with an electric contact provided on the accessory shoe on the camera body, and a demountable foot member removably mounted to said base, said demountable foot member being so positioned on said base and of such a shape as to elongate the main portion of the standardized foot part in said direction parallel to said base to make the foot longer.

4,019,191
PHOTOMETRIC DEVICE FOR USE IN A SINGLE LENS REFLEX CAMERA

Katsuhiko Miyata, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

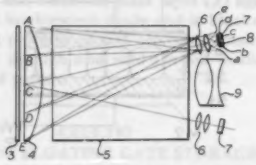
Filed Mar. 5, 1975, Ser. No. 555,704
Claims priority, application Japan, Mar. 23, 1974, 49-33269[U]
Int. Cl.² G03B *19/12, 13/02*
U.S. Cl. 354—155 **2 Claims**

1. In a single lens reflex camera wherein light from a subject is imaged by a camera lens on a focusing means for viewing by an eyepiece through a pentaprism, the improvement comprising a photometric device located beside said eyepiece, said photometric device comprising:

a first photometric lens mounted on one side of said eyepiece in a position such that said first photometric lens receives light through said pentaprism from substantially

the entire area encompassed by the subject imaged by the camera lens of said single lens reflex camera on said focusing means for viewing by said eyepiece; and,

a first light receiving element having a photosensitive surface, said first light receiving element mounted at the focal plane of said first photometric lens such that light received by said first photometric lens impinges on the entire photosensitive surface of said first light receiving element, said photosensitive surface being sized such that



said impinging light is only a portion of the light received by said first photometric lens through said pentaprism from the area encompassed by the subject imaged by the photographic lens of the single lens reflex camera on said focusing means for viewing by said eyepiece, said first light receiving element producing an electrical output related to the intensity of the light impinging on said photosensitive surface of said first light receiving element.

4,019,192

PHOTOGRAPHIC CAMERA OF THE RETRACTABLE LENS TUBE TYPE WITH A MOVABLE LENS COVER

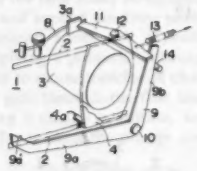
Fumihiro Miyagawa, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan

Filed May 20, 1975, Ser. No. 579,060

Claims priority, application Japan, May 20, 1974, 49-55591; May 20, 1974, 49-56451[U]

Int. Cl.² G03B 17/04

U.S. Cl. 354—187 **5 Claims**



1. A photographic camera of the retractable objective lens tube type comprising, in combination,

a. an objective lens tube movable between a retracted position, in which the lens tube is disposed within the camera, and a picture-taking position, in which the lens tube projects outwardly of the camera from a front surface of the camera;

b. means biasing said lens tube to move forwardly from its retracted position;

c. means locking said lens tube in its retracted position against the bias of said biasing means;

d. protective cover means movable along a guide path parallel to said front surface of the camera between an operative position, in which it covers said lens tube in its retracted position, and an inoperative position, in which it is retracted from the path of movement of said lens tube; and

e. means operative, in conjunction with the movement of said cover means to its inoperative position, to release said locking means thereby to permit said lens tube to move forwardly from its retracted position, said cover means consisting of a pair of halves movable in respective opposite directions along said guide path.

4,019,193

DEVELOPER APPARATUS

Willard J. Holman, Barrington, and Morris Tolliver, Streamwood, both of Ill., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed July 3, 1974, Ser. No. 485,347

Int. Cl.² G03D 7/00

U.S. Cl. 354—300 **14 Claims**

1. Apparatus for developing a diazo photographic medium in the presence of heat and in an ammonia vapor atmosphere comprising:

a chamber containing said ammonia vapor atmosphere;

a heat transfer plate disposed within said chamber, said heat transfer plate having a heated working surface applying heat to said diazo photographic medium upon contact therewith;

first and second pairs of rollers disposed on opposite ends of said working surface in parallel relationship thereto for passing the diazo photographic medium through said chamber and across said working surface;

a source of ammonia vapor;

a conduit connected to said ammonia vapor source and to said chamber and passing ammonia vapor from said source to said chamber to be heated by said heat transfer plate; and

means for urging a portion of the photographic medium into intimate contact with a portion of said working surface to increase the heat transfer between said portion of said working surface and said portion of said photographic medium, said urging means including a pressure roller disposed adjacent to said portion of said working surface between said first and second pairs of rollers, said pressure roller and said heat transfer plate cooperating to receive said diazo photographic medium between said pressure roller and said portion of said working surface as the diazo photographic medium passes between said first and second pairs of rollers to thereby apply pressure to said portion of said diazo photographic medium locally to increase the developing rate of said portion of said diazo photographic medium between said pressure roller and said portion of said working surface.

4,019,194

PHOTOGRAPHIC APPARATUS FOR PROCESSING LARGE FORMAT, SELF-DEVELOPING FILM UNIT

Norman W. Cutler, Jr., Braintree, and Duncan C. Sorli, Chelmsford, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 8, 1975, Ser. No. 638,352

Int. Cl.² G03D 9/02

U.S. Cl. 354—312 **22 Claims**

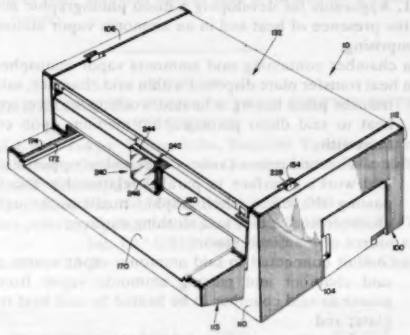
1. A processor for receiving and supporting a lighttight cassette holding a self-developing film unit of a given total length and for advancing the film unit from the cassette, dis-

tributing a fluid processing composition within the film unit and providing a light-free enviornment for the film unit, the film unit being of the type having a plurality of layers including photosensitive and image- receiving layers, a rupturable container holding a fluid processing composition adapted to be distributed between a predetermined pair of such layers, and a film unit manipulation tab extending forwardly of a leading end of the film unit, the cassette being of the type included a light sealed opening at one end thereof through which the tab may protrude and also through which the film unit may be withdrawn from the cassette by pulling on the tab, said processor comprising:

a housing having a film entry slot therein through which such a film unit may be advanced in said housing;

means on said housing for receiving and supporting such a cassette holding a film unit such that the opening at one end of the cassette faces and is in alignment with said film entry slot;

processing means, including a pair of rotatably mounted pressure-applying rollers located within said housing with a film entry side of said rollers adjacent said film entry slot for engaging a film unit manipulation tab, extending through said film entry slot, and for advancing the film unit from the cassette, into said housing, and between said pair of rollers to an exit side thereof and for progressively applying a compressive pressure along the length of the film unit to distribute the fluid processing composi-



tion between the predetermined pair of layers of the film unit, said processing means also including means for rotatably driving at least one of said pair of rollers in a direction to cause the film unit to be advanced therebetween from the entry side of the rollers to the exit side thereof;

means defining a dark chamber on said exit side of said rollers for receiving and supporting a film unit in a substantially light-free environment, said dark chamber defining means including first and second dark chamber sections, each being of a length that is less than the given total length of such a film unit, said first section being located on said housing and having a film entry opening at one end thereof located in alignment with the path of travel of a film unit emerging from the exit side of said rollers, said second section being coupled to said housing for movement, without being uncoupled from said housing, between an operative position wherein at least a major portion of said second section extends outwardly beyond said housing and said second section is in alignment and communication with an opposite open end of said first section to form a dark chamber, in cooperation with said first section, of sufficient length to receive and support a film unit of such a given total length, and a storage position wherein said second section is located in superposed relation to at least said first section; and

means providing access to said dark chamber, defined by said first and second sections located in said operative position, for removing a processed film unit therefrom.

4,019,195

SEMI-CONDUCTOR DEVICE CAPABLE OF SUPPORTING HIGH AMPERAGES OF INVERSE CURRENT

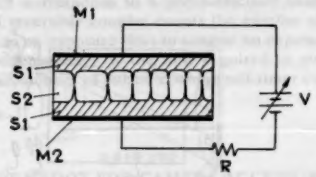
Elias Munoz Merino, Madrid, Spain, assignor to Fabrica Espanola Magnetos, S.A., Madrid, Spain

Filed July 3, 1975, Ser. No. 592,873

Claims priority, application Spain, Dec. 21, 1972, 409921

Int. Cl.² H01L *29/90, 29/04*

U.S. Cl. 357—13 **4 Claims**



1. A solid-state surge arrester device comprising a quasimonocrystalline semiconductor made up of a plurality of grains, said semiconductor containing a background dopant of one of the two types, n and p, of doping materials, and a layer of diffused dopant of the other type, wherein:

said semiconductor contains grain boundries in sufficient number and of sufficiently low angle to cause an etch pit density in excess of $10^6/cm^2$;

said grain boundries contain higher concentrations of said dopants than said grains; and

said grain boundries form a plurality of p^+n^+ junctions.

4,019,196

INDICATING ELEMENT AND METHOD OF MANUFACTURING SAME

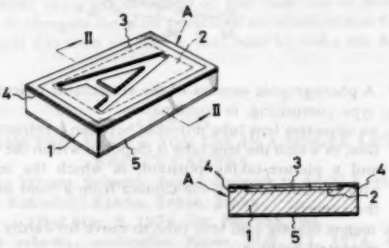
Toru Teshima, Hatano; Hoichiro Kashiwabara, Hino, and Yoshinori Uchiyama, Machida, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,685

Claims priority, application Japan, Nov. 22, 1974, 49-134971; Feb. 25, 1975, 50-25852[U]; Feb. 25, 1975, 50-25853[U]; Feb. 25, 1975, 50-25854[U]

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **20 Claims**



1. An indicating element comprising:

a semiconductor base plate (1) of epitaxial crystals of a first conductivity type;

a first electrode (5) on a surface of said base plate;

a planar semiconductor layer (2) of a second conductivity type opposite to that of said first conductivity type embedded in an opposite surface of said base plate (1), an exposed junction being defined therebetween, said base

plate (1) and said planar layer (2) forming a luminescent diode;

a protective layer (4) over the exposed junction between said base plate (1) and planar (2); and

an electrode mask layer (3) provided on said planar layer (2), base plate (1) and protective layer (4) and defining a predetermined indicating pattern, said electrode mask layer having light blocking portions over a substantial surface portion of said planar layer (2) and void portions, said void portions defining said predetermined pattern;

whereby when electric power is applied across said first electrode (5) and electrode mask layer (3) light is emitted from said luminescent diode and is blocked by said light blocking portions of said electrode mask layer (3) and is passed through said void portion to display said predetermined pattern.

4,019,197

SEMICONDUCTOR FLOATING GATE STORAGE DEVICE WITH LATERAL ELECTRODE SYSTEM

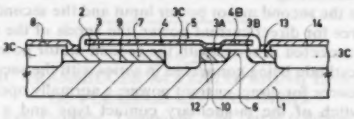
Jan Lohstroh, and Roelof Herman Willem Salters, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,705

Claims priority, application Netherlands, Jan. 17, 1975, 7500550

Int. Cl.² H01L *29/78, 29/88, 29/34, 29/04*

U.S. Cl. 357—23 **9 Claims**



1. A floating gate solid state storage device comprising a body having a semiconductor region of first type conductivity and first and second surface zones of second type conductivity, a first insulator portion through which charge carriers can tunnel on the surface of the second zone, a second insulator portion through which charge carriers cannot tunnel covering entirely the surface of the first zone, an isolated floating gate electrode on the first and second insulator portions and overlying the first and second zones and capacitively coupled thereto, means for applying a potential between the first and second zones sufficient to cause transfer of charge carriers to and from the floating gate through the first insulator portion by tunneling for storing a charge condition, and means connected to the device for sensing the charge condition of the floating gate.

4,019,198

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE

Norio Endo, and Yoshio Nishi, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

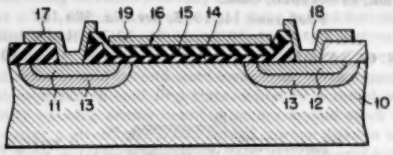
Filed July 3, 1974, Ser. No. 485,703

Claims priority, application Japan, July 5, 1973, 48-75283

Int. Cl.² H01L *29/78, 29/34;* **G11B** *13/00, 9/02*

U.S. Cl. 357—23 **7 Claims**

1. A non-volatile semiconductor memory device comprising a semiconductor substrate of one conductivity type having an impurity concentration of below 10^{15} atoms per cm^3; source and drain regions formed in a spaced-apart relationship on one side of the semiconductor substrate to define p-n junctions with the substrate; a gate having first and second insulating films; said first insulating film being formed at that portion of the semiconductor substrate situated on said one side of the semiconductor substrate and between the source and drain regions and having a thickness to permit incoming electric charges to be moved to its upper surface; said second insulating film being formed on the first insulating film to trap incoming electric charges therein; and an impurity diffusion layer formed to surround at least one of the junctions defined by the source and drain regions with the substrate, and having the



same conductivity type as the semiconductor substrate, an impurity concentration above 10^{17} atoms per cm^3 at the portion of the maximum impurity concentration and a width of below 1 μm.

4,019,199

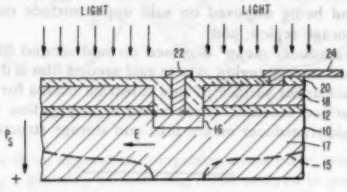
HIGHLY SENSITIVE CHARGE-COUPLED PHOTODETECTOR INCLUDING AN ELECTRICALLY ISOLATED REVERSED BIASED DIFFUSION REGION FOR ELIMINATING AN INVERSION LAYER

Savvas Georgiou Chamberlain, Waterloo, Canada, and Lawrence Griffith Heller, Brewster, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,862

Int. Cl.² H01L *29/78, 27/14, 31/00, 29/34*

U.S. Cl. 357—24 **4 Claims**



1. A low capacitance charge-coupled semiconductor photodiode structure comprising,

a semiconductor substrate layer of one conductivity type,

a diffusion region of opposite conductivity type disposed in the surface of said substrate, the area of said diffusion region being substantially smaller than the area of said substrate surface,

a first insulating layer disposed on said substrate surface exclusive of said area of said diffusion region,

a layer of gate material disposed on the surface of said first insulating layer which in combination with said substrate layer forms a photodiode,

a second insulating layer disposed on the surface of said gate layer and the surface of said diffusion region,

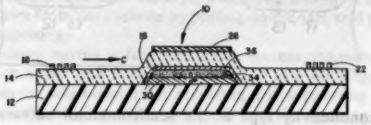
a first electrically conductive contact extending through said second insulating layer to connect an output device to a portion of the surface of said diffusion region,

a second electrically conductive contact for connecting a controllable bias voltage means to said layer of gate material for biasing said diffusion region positive to eliminate any inversion layer at the interface of said first insulating layer and said substrate and electrically isolating said diffusion region from said photodiode formed by said gate material and said first insulating layer, said photodiode being responsive to light radiation directed on said surface of said second insulating layer to generate charge carriers proportional to said light, said charge carriers being collected by said diffusion region to produce an electrical output signal on said first contact representative of said light radiation.

4,019,200
MONOLITHIC SURFACE ACOUSTIC WAVE SIGNAL STORAGE DEVICE

Larry R. Adkins, Tustin, and James L. Gates, Costa Mesa, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed June 11, 1975, Ser. No. 586,107
Int. Cl.² H01L *29/84, 29/96, 29/78;* **H04N** *3/00*
U.S. Cl. 357—26 **10 Claims**



1. A monolithic signal storage and processing device comprising:

a. a storage structure including:
   1. a layer of relatively high resistivity semiconductor material;
   2. a first film of dielectric material disposed on said layer of relatively high resistivity semiconductor material;
   3. a second film of dielectric material having piezoelectric properties disposed on said first film; and
   4. electrode means for applying and sensing voltages across said storage structure;

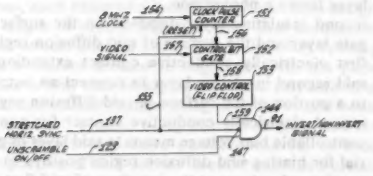
b. substrate means for supporting said storage structure, said substrate means having an upper surface, said second film extending further along said substrate upper surface then said layer, said first film and said electrode means and being disposed on said upper surface outside said storage region; and

c. transducer means disposed on said second film outside said storage region, where said second film is disposed on said upper surface of said substrate means for launching surface acoustic waves along a propagation path from said transducer means into said storage structure.

4,019,201
METHOD AND APPARATUS FOR SCRAMBLING AND UNSCRAMBLING COMMUNICATION SIGNALS

Albert F. Hartung, Woodland Hills; Frank W. Lehan, Santa Barbara; Charles T. Barooshian, Pacific Palisades, and Edward J. Zacharski, Malibu, all of Calif., assignors to System Development Corporation, Santa Monica, Calif.

Division of Ser. No. 388,439, Aug. 15, 1973, Pat. No. 3,919,462. This application Sept. 2, 1975, Ser. No. 609,573
Int. Cl.² H04N *1/44*
U.S. Cl. 358—124 **6 Claims**



1. For use with receivers in a subscription television system, a method of unscrambling composite television video and synchronization signals scrambled by the inversion of video portions corresponding to preselected lines in a television picture, comprising the steps of:

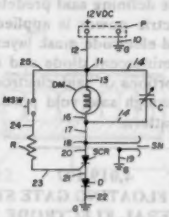
receiving and decoding inversion indicator signals transmitted one with each line of the television picture; and

selectively inverting the video signals only when a decoded inversion indicator signal is in a particular state.

4,019,202
AUTOMATIC SHUT-OFF CIRCUIT FOR EIGHT-TRACK TAPE PLAYERS AND THE LIKE

John P. Arvesen, c/o Universal Sound, Inc., 110 S. Court, Fairfield, Iowa 52556

Filed Sept. 24, 1975, Ser. No. 616,441
Int. Cl.² G11B *15/06, 15/52, 19/20*
U.S. Cl. 360—74 **4 Claims**

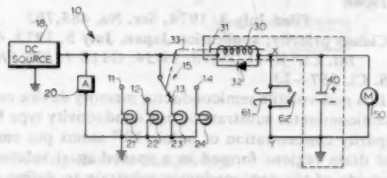


1. In an eight-track tape player or the like having a tape drive motor of the direct current type with first and second power inputs, the first and second motor power inputs being respectively connectible in series to the first and second sides of a source for direct current power, the improvement comprising: an electric circuit for automatically shutting off the drive motor upon the completion of a taped program, the circuit consisting of a silicon controlled rectifier disposed between the second motor power input and the second side of the source for direct current power, the anode of the rectifier being connected in series with the second motor power input and its cathode being connected in series with the second side of the source for direct current power; a normally open motor start switch of the momentary contact type and a voltage dropping resistor connected in series with each other and disposed between the first side of the source for direct current power and the gate of the rectifier; a stabilizing diode disposed between the silicon controlled rectifier and the second side of the source for direct power, the anode of the diode being connected in series with the cathode of the rectifier and the cathode of the diode being connected in series with the second side of the source for direct current power; and a tape sensor having a pair of circuit making contacts connected in shunt relation with the rectifier, the sensor being adapted to contact the tape and to have the circuit closed through its contacts by means carried by the tape.

4,019,203
FILTERS FOR TAPE RECORDING SYSTEMS

Bill Soichro Yamanashi, Durham, N.C., and Tadashi Fujita, Ishikawa, Japan, assignors to Electromechanics Research, Durham, N.C.

Filed Oct. 31, 1975, Ser. No. 627,798
Int. Cl.² H01H *7/14;* **G11B** *21/08, 5/02, 15/00*
U.S. Cl. 360—78 **7 Claims**



1. In a tape player-recorder of the type having a load in the nature of a drive motor, amplifier, or the like, a DC power source, normally open momentary switch means and circuitry electrically connecting said load and switch means to said power source, said switch means being adapted for momen-

tarily closing in response to the sensing of a selected tape position or the operation of a manual control, an improved filter circuitry comprising in combination:

a. solenoid actuator means including a solenoid coil and means responsive to sufficient level of energization of said coil for actuating an electromechanical operator associated with a switch, ejector, channel shifter, or the like, within said player-recorder;

b. electrical connector means for connecting said switch means and said load in parallel and further connecting said solenoid coil in series with said power source and between said power source and one side of the parallel circuitry which includes the load and the momentary switch means thereby providing a fixed current path from said source to said load through said coil and a selectively operable shorting path parallel to said load through said switch means; and

c. capacitor means electrically connected to said solenoid coil of said actuator means in an operative position to form a filter circuit in combination with said solenoid coil;

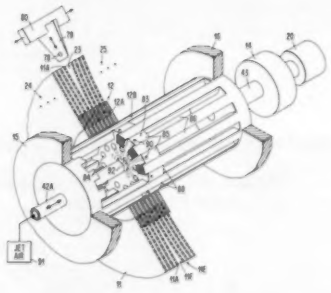
whereby during normal operation of said player-recorder said momentary switch means is open and a normal operating current flows through the solenoid coil for powering said load while said solenoid coil in conjunction with said capacitor means simultaneously provides a filtering action associated with said load and in correspondence with momentary closing of said switch means said solenoid coil is energized in a manner to cause said actuator means to actuate said electromechanical operator.

4,019,204

FLUIDIC TRANSDUCER ACCESS OPENING IN A STACK OF FLEXIBLE RECORD DISKS

Donald Eric Griffiths, Longmont, and David Gibbons Norton, Boulder, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,320
Int. Cl.² G11B *5/016, 5/76, 15/64*
U.S. Cl. 360—99 **42 Claims**



1. Record storage apparatus having a coaxial stack of flexible record disks mounted for rotation with a rotatable spindle, a frame mounting said spindle for rotation, means for supplying fluid for radial outward movement between adjacent ones of said record storage disks in said stack,

the improvement including in combination:

said fluid supply means supplying said fluid to establish a given rotational stability state in said stack of disks;

means coaxial with and having a lesser axial extent than said spindle and being movable axially with respect thereto and having a predetermined fluid communicative relationship to a plurality of said disks axially aligned therewith;

said communicative relationship altering said radial outward fluid flow between said axially aligned disks such that rotational stability state other than said given state occurs in said disks axially aligned with said coaxial means;

a first of said rotational states being a fully spaced apart stable rotational state, and a second of said rotational states being less than said fully stable rotational state; and

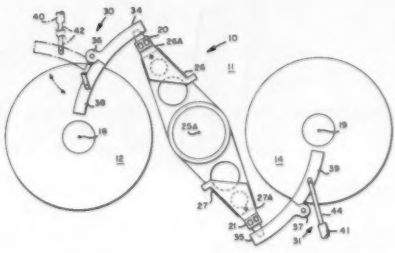
means at the interface between said disks in said first state and said second state to activate partial axial movement of a radially outward portion of predetermined ones of said disks in said second state away from disks adjacent said interface in said first state, whereby a radial outwardly opening access opening occurs in said stack for accessing a given one of said record storage disks in said first state and which faces said disks adjacent said interface and are in said second state.

4,019,205

DISC DRIVE WITH ROTARY ACCESS MECHANISM

Kent A. Salmond, Los Gatos, and Ivan Pejcha, Santa Clara, both of Calif., assignors to Information Storage Systems, Inc., Cupertino, Calif.

Filed Sept. 16, 1974, Ser. No. 506,122
Int. Cl.² G11B *5/54, 21/22, 5/55, 5/56*
U.S. Cl. 360—105 **4 Claims**



1. A disc drive apparatus, comprising a baseplate, means for supporting a plurality of recording discs arrayed in packs on the baseplate for rotation about respective vertically extended axes of rotation spaced from and extending parallel to each other, with each respective recording disc including a surface thereon for the recording of data thereon,

drive means for rotating each said disc about said respective axis,

a read/write head associated with each disc surface for reading or writing data thereon,

a plurality of elongated support arms having first and second ends with each having the first end thereof fixed to a respective one of the read/write heads,

a rotary actuator supported on the baseplate at a position between the recording disc supporting means and selectively rotatable about a central axis extending parallel to the disc axes of rotation,

means connecting each support arm second end to the actuator whereby with rotation of the actuator, said read/write heads are moved across the respective disc surface in unison,

means to detect the relative position of the heads and respective disc surfaces thereby to enable the positioning of the heads at preselected locations on the disc surface,

means to load the read/write heads toward the respective disc surface for the efficient transduction of data therebetween, and

said last mentioned means including means for resiliently biasing each read/write head into a loaded position adjacent its associated disc surface, camming means for directing each read/write head away from its associated disc surface into an unloaded position, cam riding means secured to each of said first ends of said elongated support arms for engaging said camming means, and pivot-

ting means for selectively rotating said camming means into and out of engagement with said cam riding means.

4,019,206

METHOD AND APPARATUS FOR MAGNETIC RECORDING OF DATA WITH A RECORDING HEAD HAVING A PLURALITY OF PHYSICALLY PARALLEL, SERIALLY CONNECTABLE CONDUCTORS

Peter Haas, 113 Richmond Ave., Ridgewood, N.J. 07450

Continuation of Ser. No. 178,694, Sept. 8, 1971, abandoned. This application June 7, 1973, Ser. No. 367,738

Int. Cl.² G11B 5/20

U.S. Cl. 360—123 **11 Claims**

1. Apparatus for recording data on a cooperating magnetic recording medium comprising:

a plurality of electrical conductors with a single segment of each of the conductors mounted in parallel positional relationship to corresponding segments of the other conductors with each segment in proximity to the magnetic recording medium;

switching means for connecting selected conductors in a single series circuit; and

means for energizing the segments of the selected conductors and thereby recording data on the magnetic medium by passing current in the form of a single short duration,

high peak current pulse through the selected conductors in series;

said energizing means comprises a capacitor and means for rapidly discharging said capacitor.

DESIGN PATENTS

GRANTED APRIL 19, 1977

ERRATA

For CLASS	See PATENT NO.
007–015	244,063
007–023	244,064
007–023	244,065
013–021	244,095
014–086	244,096
014–093	244,097
014–005	244,102

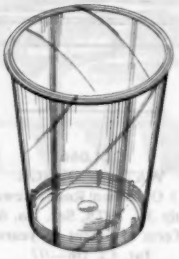
DESIGNS

APRIL 19, 1977

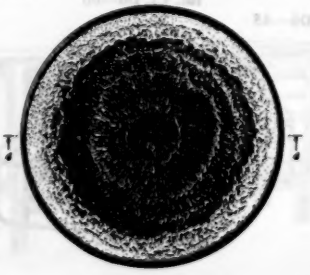
244,061
NECKWEAR
Walter W. Haines, Sr., 1511 Oakdale St., Philadelphia, Pa. 19132
Filed Jan. 20, 1975, Ser. No. 542,567
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—351

244,062
NECKWEAR
Walter W. Haines, Sr., 1511 Oakdale St., Philadelphia, Pa. 19132
Filed Jan. 20, 1975, Ser. No. 542,568
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—351

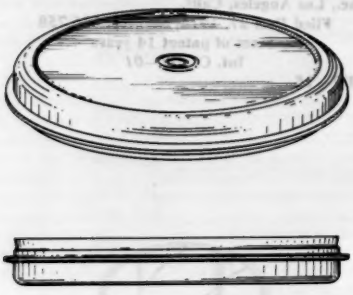
244,063
CUP
Hubert E. Christian, Phoenix, Ariz., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Dec. 27, 1974, Ser. No. 536,758
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—15



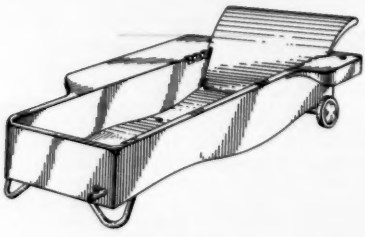
244,064
PLATE
Tapio Wirkkala, Helsinki, Finland, assignor to A. Ahlstrom Osakeyhtio, Iittala, Finland
Filed May 27, 1975, Ser. No. 581,412
Claims priority, application Finland, Nov. 28, 1974, 74623
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



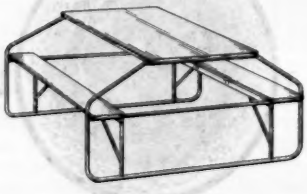
244,065
SERVING BOWL OR THE LIKE
Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Sept. 10, 1975, Ser. No. 612,153
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



244,066
WATER LOUNGE
Robert Gildea, 2213 Ogletown Road, Newark, Del. 19711
Filed July 31, 1975, Ser. No. 600,630
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

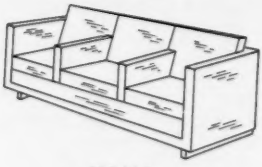


244,067
COLLAPSIBLE PICNIC TABLE
Philip E. Uhl, Luna Pier, Mich., assignor to Toledo Metal Furniture Company, Toledo, Ohio
Filed Nov. 13, 1975, Ser. No. 631,614
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—45

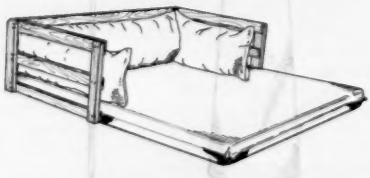


244,068
HANGING CHAIR
Woodland McAdoo Styron, Jr., 102 Stokley Drive, Wilmington, N.C. 28401
Filed July 21, 1975, Ser. No. 597,849
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47

244,069
CONVERTIBLE SEAT OR SIMILAR ARTICLE
Leon Summer, 8105 Howard St., Omaha, Nebr. 68114
Filed May 9, 1975, Ser. No. 576,146
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

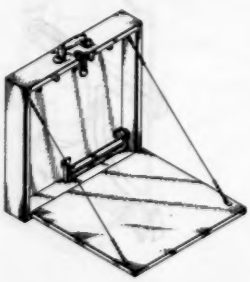


244,070
CONVERTIBLE SOFA
Robert J. Marks, 9350 SW. 106th St., Miami, Fla. 33157
Filed Aug. 15, 1975, Ser. No. 605,188
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

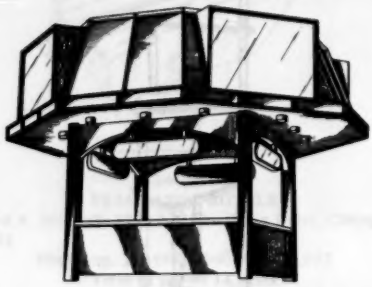


244,071
ARM CHAIR
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jan. 7, 1976, Ser. No. 647,225
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71

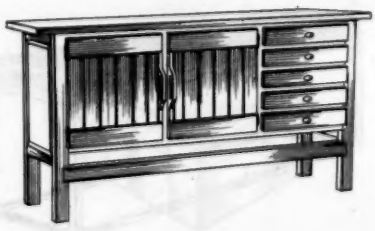
244,072
BARBECUE TOOL CABINET
John J. Schaecher, 3351 W. Grand Ave., Englewood, Colo. 80110
Filed May 24, 1976, Ser. No. 689,100
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—128



244,073
AUDIO AND VISUAL DISPLAY BOOTH
Donald M. Urbaniec, 21 W 041 Monticello, Lombard, Ill. 60148; Jerry L. Stanbrough, 600 W. Surf, Chicago, Ill. 60657, and Alois A. Masters, 612 Park, Saugatuck, Mich. 49453
Filed July 28, 1975, Ser. No. 600,104
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—157



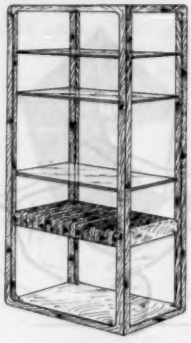
244,074
BUFFET
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,041
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



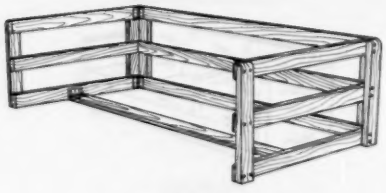
244,075
TABLE
Marion Imber, Stamford, Conn., and Seymour Wezenter, Fair Lawn, N.J., assignors to Ray Control Corporation, New York, N.Y.
Filed Apr. 14, 1976, Ser. No. 676,778
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179

244,076
TABLE
Richard B. Saltz, Huntington Harbor, Calif., assignor to Charlton Co., Inc., Leominster, Mass.
Filed Jan. 21, 1976, Ser. No. 651,055
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

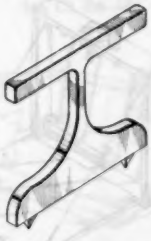
244,077
SHELF UNIT OR SIMILAR ARTICLE
Richard B. Saltz, Huntington Harbor, Calif., assignor to Charlton Co., Inc., Leominster, Mass.
Filed Jan. 21, 1976, Ser. No. 651,056
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



244,078
FURNITURE FRAME
Robert J. Marks, 9350 SW. 106th St., Miami, Fla. 33157
Filed Aug. 15, 1975, Ser. No. 605,189
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



244,079
CAN LID PUNCH
Robert H. Heckroth, 7631 Commodore Circle, Huntington Beach, Calif. 92646
Filed June 30, 1975, Ser. No. 591,769
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—41



244,080

HINGED LOCK FOR LUGGAGE OR THE LIKE

Alain D. Perrin, Boulogne, France, assignor to Les Must de Cartier, Paris, France

Filed May 2, 1975, Ser. No. 573,945

Claims priority, application France, Nov. 4, 1974, 74.30658

Term of patent 14 years

Int. Cl. D8—*07*

U.S. Cl. D8—338

244,081

KEY BLANK FOR AN AXIAL TUMBLER-TYPE LOCK

Robert L. Steinbach, Chicago, Ill., assignor to Chicago Lock Co.

Filed Oct. 5, 1976, Ser. No. 729,793

Term of patent 14 years

Int. Cl. D8—*07*

U.S. Cl. D8—347

244,082

WALL PLATE

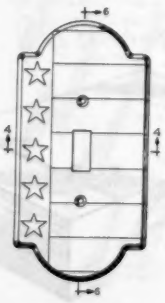
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company

Filed Dec. 23, 1974, Ser. No. 536,272

Term of patent 14 years

Int. Cl. D8—*09*

U.S. Cl. D8—351



244,083

SAIL BOAT MAST SETTING BRACKET

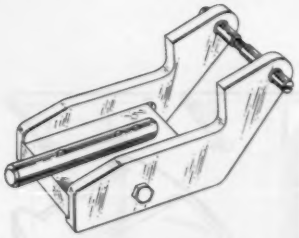
Joachim A. Pfeiffer, 4373 Faraday Drive, San Jose, Calif. 95124

Filed Mar. 20, 1975, Ser. No. 560,537

Term of patent 14 years

Int. Cl. D8—*08*; D12—*06*

U.S. Cl. D8—354



244,084

FRAGRANCE BOTTLE

Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611

Filed Aug. 20, 1975, Ser. No. 606,015

Term of patent 14 years

Int. Cl. D9—*01*

U.S. Cl. D9—157

244,085

CONTAINER FOR MINERAL SPECIMENS

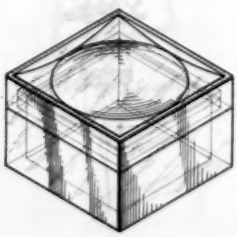
Daniel S. Giddings, 33 Wedgewood Lane, Lawrence, N.Y. 11559, and Julian Fabian, 140 S. Middleneck Road, Great Neck, N.Y. 11201

Filed Dec. 11, 1974, Ser. No. 531,551

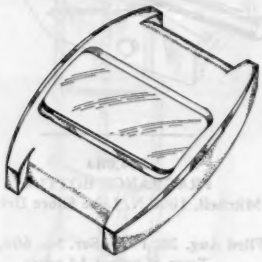
Term of patent 14 years

Int. Cl. D9—*03*

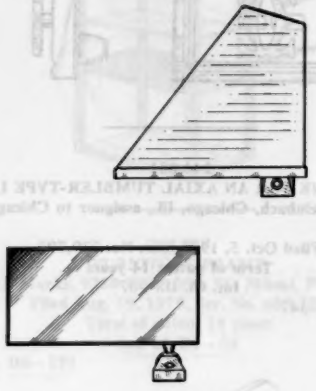
U.S. Cl. D9—193



244,086
DIGITAL WATCH CASING
William James Lawrence, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Continuation-in-part of Ser. No. 535,265, Dec. 23, 1974. This application June 16, 1975, Ser. No. 587,529
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

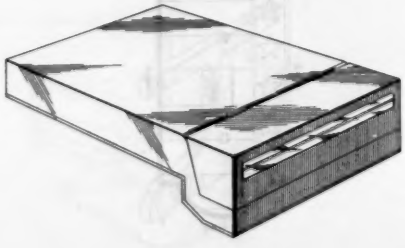


244,088
REAR-VIEW MIRROR
Raymond A. McCarroll, 1725 Newcastle, Grosse Pointe Woods, Mich. 48236
Division of Ser. No. 614,520, Sept. 18, 1975. This application July 26, 1976, Ser. No. 708,420
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—187



244,087
FIGURINE
Gerald Thomas Patton, 11 Club Drive, West, Pittsburgh, Pa. 15236
Filed Nov. 24, 1975, Ser. No. 634,473
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160

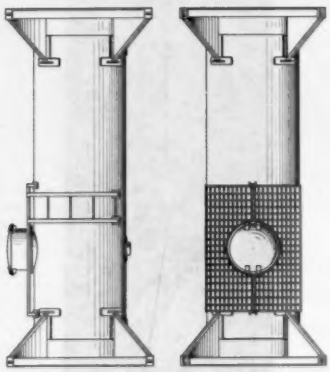
244,089
PHOTOGRAPHIC CAMERA BACK OR SIMILAR ARTICLE
Rolf M. Augustin, Jr., Wellesley, and Norman W. Cutler, Jr., Braintree, both of Mass., assignors to Polaroid Corporation
Filed Nov. 4, 1975, Ser. No. 628,461
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—10



244,090
RULER
John Brownridge West, 4 Quail Valley Drive, Thornhill, Ontario, Canada (L3T 4R2)
Filed Sept. 2, 1975, Ser. No. 609,198
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—35

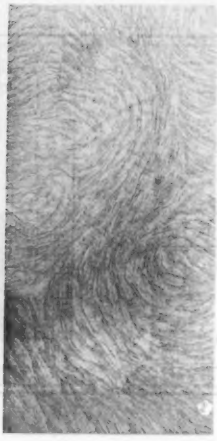
244,091
CHILD'S COMPASS
William J. Bryant, 2251 Washington Ave., San Leandro, Calif. 94577
Filed June 30, 1975, Ser. No. 591,828
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—38

244,092
INTERMODAL CONTAINER
Erling Mowatt-Larssen, Warren, Ohio, and Thomas S. Lapikas, Sharon, Pa., assignors to General American Transportation Corporation, Chicago, Ill.
Filed Oct. 14, 1975, Ser. No. 622,252
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2

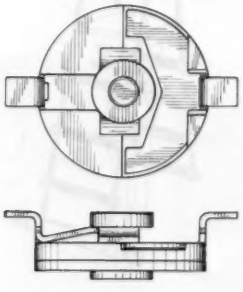


244,093
SWIMMING POOL SAFETY LADDER
Peter F. Gannon, Troy, Mich., assignor to Vinyl-Fab Industries, Ferndale, Mich.
Filed Aug. 15, 1973, Ser. No. 388,584
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—64

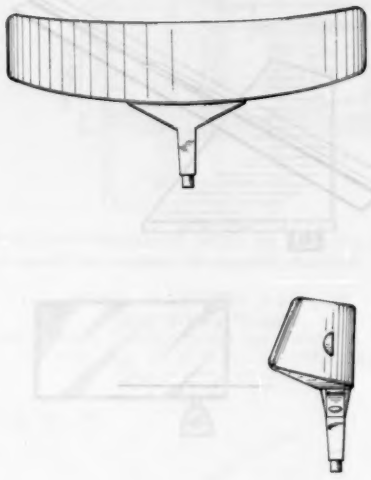
244,094
DEEP TEXTURED DECORATIVE LAMINATE SHEET
Jack August Willard, Hamilton, Ohio, assignor to Formica Corporation, Cincinnati, Ohio
Filed Sept. 12, 1974, Ser. No. 505,410
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—84



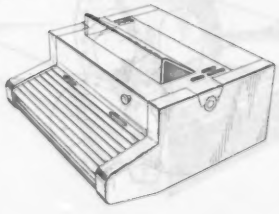
244,095
CAPACITOR
Chander M. Wahi, and Robert J. Baumler, both c/o E. F. Johnson Company, 299 Tenth Ave. SW., Waseca, Minn. 56093
Filed July 28, 1975, Ser. No. 599,725
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—21



244,096
PLATE-TYPE ANTENNA
Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France
Filed July 2, 1976, Ser. No. 702,487
Claims priority, application France, Jan. 7, 1976, 76.74457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

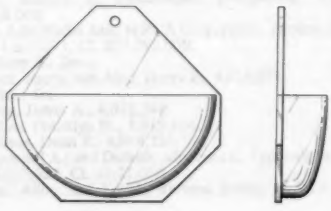


244,097
HOUSING FOR TELEPRINTERS AND THE LIKE
Berndt Ebbe Frick, Herrgardsvagen 9, 135 00 Tyreso, Sweden
Filed July 3, 1975, Ser. No. 592,749
Claims priority, application Sweden, Jan. 16, 1975, 7599
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—93



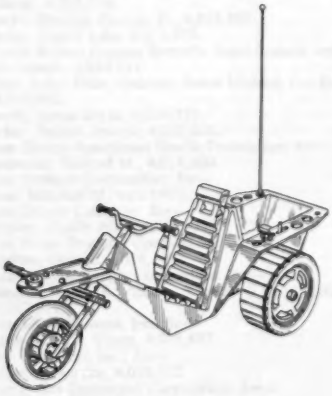
244,098
BIRD FEEDER
Peter Kilham, Box 98, Foster, R.I. 02825
Filed Apr. 26, 1976, Ser. No. 680,375
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—14

244,099
WALL MOUNTABLE AQUARIUM OR SIMILAR ARTICLE
Tony Robert, 5701 SW. Freeway, Houston, Tex. 77057
Filed Mar. 10, 1975, Ser. No. 557,037
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—7

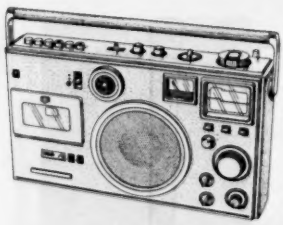


244,100
GOLF CLUB GRIP
Clifford A. Spencer, Akron, Ohio, assignor to Eaton Corporation
Filed June 3, 1975, Ser. No. 583,302
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GS

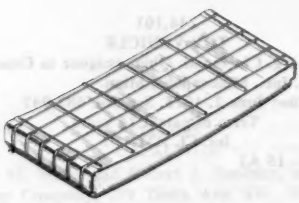
244,101
TOY VEHICLE
Dale I. Goldberg, Cincinnati, Ohio, assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed June 2, 1975, Ser. No. 582,947
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



244,102
COMBINED PORTABLE RADIO AND TAPE RECORDER
Kazumasa Takenaka, Moriguchi, and Kikuo Ohta, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed June 2, 1975, Ser. No. 583,138
Claims priority, application Japan, Dec. 6, 1974, 49-43065
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—5



244,103
POCKET FINGER EXERCISE BOARD
Michael M. Greer, Box 22, McGrath, Alaska 99627
Filed July 21, 1975, Ser. No. 597,786
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 R



244,104
HARP
Walter Krasicki, 5810 W. Schubert, Chicago, Ill. 60639
Filed July 25, 1975, Ser. No. 598,860
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

244,105
HEADLIGHTS REMINDER AND COIN HOLDER
John L. Piekarski, Janesville, Wis., assignor to Ozburn-Janesville Corporation, Janesville, Wis.
Filed Sept. 12, 1975, Ser. No. 612,950
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 19TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See*—
Borneman, Lawrence A., 4,018,158.

A. Christiaens Societe Anonyme: *See*—
Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., 4,018,929.

A/S Lovens Kemiske Fabrik Produktionsaktieselskab: *See*—
Feit, Peter Werner; and Nielsen, Ole Bent Tvaermose, 4,018,794.

A. Tonolli & C. S.p.A.: *See*—
Capetti, Raffaele, 4,018,376.

AAI Corporation: *See*—
Barr, Irwin R., 4,018,211.

AB Samefa: *See*—
Lofdahl, Christer Edvin, 4,019,135.

AB Volvo: *See*—
Perhed, Per-Gunnar Arthur, 4,018,343.

Abbott, Jerry Joe; and Caudill, Allison Holland, to International Business Machines Corporation. Grooved magnetic brush roll. 4,018,187, Cl. 118-658.000.

Abbott Laboratories: *See*—
Johnson, Edwin Samuel, 4,018,914.
Zaugg, Harold Elmer; Lee, Cheuk Man; Michaels, Raymond John; and Plotnikoff, Nicholas Peter, 4,018,777.

Abe, Michio, to Tokai Cold Forming Co., Ltd. Connecting-rod bolt. 4,018,132, Cl. 85-1.00L.

Abe, Yukio: *See*—
Tanaka, Junzo; Matsushima, Haruo; and Abe, Yukio, 4,019,010.

Aber, Arthur B., to Stanbel, Incorporated. Kite. 4,018,407, Cl. 244-153.00R.

Abrams, Jack Z.: *See*—
Rogers, Alfred N.; Awerbuch, Leon; and Abrams, Jack Z., 4,018,656.

Abrasive Technology, Inc.: *See*—
Lowder, James T.; and Tausch, Edwin M., 4,018,576.

Acda, Petrus Marinus; and Guitoneau, Hans Edward, to Polva-Nederland B.V. Tapping tee. 4,018,464, Cl. 285-197.000.

Acecook Co., Ltd.: *See*—
Muraoka, Keiji, 4,018,904.

ACF Industries, Incorporated: *See*—
Dugge, Richard H.; and Van Dyke, Ronald D., 4,018,484.

Acme Highway Products Corporation: *See*—
Puccio, Guy S., 4,018,539.

ACS Industries, Inc.: *See*—
Botvin, George B., 4,017,949.

Acton, Hugh Collier, to Boyertown Burial Casket Company. Casket and casket support. 4,017,947, Cl. 27-27.000.

Adachi, Teruho: *See*—
Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, 4,018,739.

Adamek, David J.; and Anderson, John A., to Hoerner Waldorf Corporation. Taco package. 4,018,905, Cl. 426-124.000.

Addressograph Multigraph Corporation: *See*—
Holman, Willard J.; and Tolliver, Morris, 4,019,193.

Adkins, Larry R.; and Gates, James L., to Rockwell International Corporation. Monolithic surface acoustic wave signal storage device. 4,019,200, Cl. 357-26.000.

Aerosol Inventions & Development S.A. AIDSA: *See*—
Butcher, Roger Anthony, 4,018,365.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Sorbier, Pierre, 4,018,394.

Agency of Industrial Science & Technology: *See*—
Kono, Hidehiko, 4,019,173.

AGFA-Gevaert, A.G.: *See*—
Bartel, Siegfried; Payrhammer, Bernd; and Wurf, Johann, 4,018,527.
Heidrich, Gunter, 4,018,152.
Lohmer, Karl; Seiz, Hermann; and Zietan, Karl, 4,018,609.
Ungnadner, Peter; and Geisslinger, Wolfgang, 4,018,517.

Ahlrich, Willard K. Electrostatic precipitator. 4,018,578, Cl. 55-138.000.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Biasing current attenuator. 4,019,071, Cl. 307-296.00R.

Aine, Harry E.: *See*—
Block, Barry; and Aine, Harry E., 4,019,056.

Airco, Inc.: *See*—
Burns, James A., 4,018,244.
Collins, Franklyn M., 4,019,168.
Wallace, Dean R., 4,018,231.

Aja, Raymond A.; and Dufault, Alphonse C. Typeball cleaning apparatus. 4,017,933, Cl. 15-21.00A.

Akselrad, Aline; and Novak, Richard Edwin, to RCA Corporation. Composition for making garnet films for improved magnetic bubble devices. 4,018,692, Cl. 252-62.570.

Aktiebolaget Alga: *See*—
Krumlinde, Jockum, 4,018,000.

Aktiebolaget Atomenergi: *See*—
Lundqwist, Nils Rune; and Dahl, Gustav Lennart, 4,018,563.

Aktiebolaget Imo-Industri: *See*—
Segerstrom, Lars, 4,018,549.

Alafuzov, Jury Pavlovich; and Itin, Artur Markovich. Vertical multiple-spindle machine. 4,018,429, Cl. 269-20.000.

Albertson, Clarence E., to Borg-Warner Corporation. Boiling heat transfer surface and method. 4,018,264, Cl. 165-1.000.

Albrecht, Albert B.: *See*—
Heaton, James W.; Warren, Donald W.; and Albrecht, Albert B., 4,018,112.

Alco-Gravure, Inc.: *See*—
Dickey, Buel Earl; and Johnson, David Earl, 4,018,629.

Alden, John M.; and Williams, George C., to Alden Research Foundation. Facsimile apparatus for scanning a selected portion of a graphic record. 4,018,985, Cl. 358-285.000.

Alden Research Foundation: *See*—
Alden, John M.; and Williams, George C., 4,018,985.

Alfin, Norman J.; and Scott, Robert, to Merlin Industries, Inc. Electroplating of recoverable silver from photographic solutions and cell with current control means therefor. 4,018,658, Cl. 204-109.000.

Allen, John Graham: *See*—
McDermott, Michael John; Allen, John Graham; Jones, Keith; and Wright, Peter Gordon, 4,018,508.

Alley, Vernon L., Jr.; and McHatton, Austin D., to United States of America, National Aeronautics and Space Administration. Amplifying ribbon extensometer. 4,018,085, Cl. 73-88.00R.

Allied Chemical Corporation: *See*—
Barrett, Joseph J., 4,018,529.

Allied Steel & Tractor Products, Incorporated: *See*—
Anderson, Jack, 4,018,291.

Allis-Chalmers Corporation: *See*—
Ehrhardt, Benonie C.; Matthews, Dean A.; and Pivarunas, Walter A., 4,018,307.
Haupt, Robert C., 4,018,297.

Alta Engineering, Inc.: *See*—
Soja, Frank John, 4,017,946.

Aluminum Company of America: *See*—
Mohajery, Mahmood; and Rawlins, Charles B., 4,018,980.

Amann & Sohne: *See*—
Strauss, Friedrich, 4,018,360.

Amberg, Stephen W., to Owens-Illinois, Inc. Decorative neckband label for a bottle. 4,018,640, Cl. 156-86.000.

Amberg, Stephen W., to Owens-Illinois, Inc. Apparatus for producing shrunken pilfer-proof neck labels for containers. 4,018,644, Cl. 156-446.000.

Amerace Corporation: *See*—
Barker, Kenneth L., 4,019,167.

American Cyanamid Company: *See*—
Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,018,764.
Brooks, Houston George, Jr., 4,018,807.
Hlavka, Joseph John, 4,018,972.
Schaub, Robert Eugene; Bernady, Karel Francis; and Weiss, Martin Joseph, 4,018,811.
Spicer, Larry Dean; Quinlan, James Michael; and Berger, Harold, 4,018,932.
Trecek, James Bryan, 4,018,751.
Tucker, Robert Jerome, 4,018,941.

American Dental Association Health Foundation: *See*—
Waterstrat, Richard M., 4,018,600.

American Denture Corporation: *See*—
Hazar, Mitchell M., 4,017,971.

American/Durein Company: *See*—
Schueler, Marlin Alios, 4,018,431.

American Home Products Corporation: *See*—
Hojaiban, George, 4,018,219.

American Hospital Supply Corporation: *See*—
Kafesjian, Ralph R.; Masse, Norman G.; and Keller, David P., 4,017,911.

American Micro-Systems, Inc.: *See*—
Raghavan, N.V. Vijaya, 4,018,507.

American Polarizers, Inc.: *See*—
Derkas, Alexander, 4,018,515.

American Safety Equipment Corporation: *See*—
Henderson, Cyril, 4,018,400.

American Stamping Company: *See*—
Morris, Roy H.; Turner, George L.; and Hixon, Walter L., 4,018,460.

AMF Incorporated: *See*—
Fiore, Joseph V., 4,018,234.

AMP Incorporated: *See*—
Grubb, Daniel Baker, 4,017,954.
Herrmann, Henry Otto, Jr.; and Glover, Douglas Wade, 4,018,977.
Hoover, Charles Donald; and Worman, Jared Nathan, 4,018,997.
Rickards, David William, 4,018,499.
Scheingold, William Samuel; and Youngfleish, Frank Christian, 4,018,494.

Amselem, Armand, to Centre d'Etudes pour l'Industrie Pharmaceutique. 2-Aminothiazolines and a process for preparation thereof. 4,018,786, Cl. 260-306.70T.

Anania, James A., Sr. Educational puzzle game. 4,018,445, Cl. 273-135.00B.

Anderson, Anders, to Suo, Patrick; and Concors, Arthur, part interest to each. Automatic braking device for nesting cart. 4,018,449, Cl. 280-33.99C.

Anderson, Jack, to Allied Steel & Tractor Products, Incorporated. Pneumatic hammer. 4,018,291, Cl. 173-135.000.

Anderson, John A.: *See*—
Adamek, David J.; and Anderson, John A., 4,018,905.

Anderson, Joseph C., to Great Canadian Oil Sands Limited. Recycling aerated scavenged middlings to conditioning step of hot water extraction process. 4,018,665, Cl. 208-11.0LE.

Anderson, Philip P., to Arkla Industries Inc. Absorption refrigerant composition. 4,018,694, Cl. 252-69.000.

Anderson, Ralph A., to Carborundum Company, The. Ceramic elements and insulation assembly including such elements. 4,018,023, Cl. 52-410.000.

Anderson, Richard B.: *See*—
McQuinn, Ted M.; and Anderson, Richard B., 4,018,316.

Andersson, Conny; and Stenkvist, Sven-Einar, to ASEA Aktiebolag. Direct current arc furnace. 4,018,974, Cl. 13-9.00R.

Ando, Koki, to Nissin Shokuhin Kaisha, Ltd. Inner lid of a receptacle for instant-cooking foods. 4,018,355, Cl. 220-23.000.

Ando, Seigo: *See*—
Yamada, Takeo; Watanabe, Katsujiro; and Ando, Seigo, 4,019,131.

Andon, Nicholaki A.; and Fleece, Robert I., to Marathon Oil Company. Intermittent catalyst addition system. 4,018,671, Cl. 208-152.000.

Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich. High-frequency raster with irregular structure of raster elements. 4,018,958, Cl. 428-141.000.

Andreoli, Bruno; Fiebig, Trauterose; and Maurer, Gustav, to Von Roll AG. Incinerator feed. 4,018,168, Cl. 110-38.000.

Andrews, Norwood H. Jet-type axial pulverizer. 4,018,388, Cl. 241-39.000.

Andros Incorporated: *See*—
Ethington, Gayle M., 4,018,223.

Angstadt, Howard P.: *See*—
Bushick, Ronald D.; and Angstadt, Howard P., 4,018,713.

Ankney, Richard C.: *See*—
Hinds, Duane E.; and Ankney, Richard C., 4,018,582.

Anson Incorporated: *See*—
Brenner, Arthur Walter, 4,018,536.

Antek Instruments, Inc.: *See*—
Parks, Robert E.; and Marietta, Robert L., 4,018,562.

Antlfinger, George J.; and Reinhart, Richard F., to B. F. Goodrich Company, The. Compositions containing a reactive hydroxyl-containing vinyl chloride polymer. 4,018,966, Cl. 428-423.000.

Aoki, Susumu: *See*—
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.

Aoki, Yukio: *See*—
Inoue, Akira; Horie, Koshi; Saito, Koichi; Aoki, Yukio; Ono, Tetsuji; and Ohara, Takashi, 4,018,706.

Apparatebau Rothemuhle Brandt & Kritzler: *See*—
Schluter, Siegfried Hans-Dietmar, 4,018,265.

Appelt, Horst Gustav: *See*—
Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,017,945.

Appleberry, Walter Thomas: *See*—
United States of America, National Aeronautics and Space Administration; and Appleberry, Walter Thomas, 4,018,092.

Applied Motors, Inc.: *See*—
Naber, Joseph S., 4,019,119.

Araki, Yoshiaki: *See*—
Noguchi, Shunsaku; Araki, Yoshiaki; Imanishi, Masayuki; and Kawai, Kiyohisa, 4,018,817.

Archer, Wesley L.; Simpson, Elbert L.; and Gerard, Raymond R., to Dow Chemical Company, The. Stabilized methylchloroform. 4,018,837, Cl. 260-652.50R.

Ariyama, Kenzo: *See*—
Tani formerly Nishikawa, Tatsuo; and Ariyama, Kenzo, 4,018,524.

Arkla Industries Inc.: *See*—
Anderson, Philip P., 4,018,694.

Armco Steel Corporation: *See*—
Standley, Robert S., 4,018,054.

Armstrong Store Fixture Corporation: *See*—
Moore, David M., 4,017,943.

Armstrong, William W., to Pfizer Inc. Oxytetracycline compositions. 4,018,889, Cl. 424-80.000.

Arnaud, Guy: *See*—
Michaux, Jean-Pierre; and Arnaud, Guy, 4,018,843.

Arnold, Robert J.; and Gattuso, Marion J., to UOP Inc. Vulcanization inhibiting compounds. 4,018,855, Cl. 260-947.000.

Aromando, Nick A., to Hillside Metal Products, Inc. Method for manufacturing ball bearings having a sintered metal powder outer race. 4,017,951, Cl. 29-149.5PM.

Aronova, Lia Ilinichna: *See*—
Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletskaya, Vera Konstantinovna, 4,018,740.

Arthur D. Little, Inc.: *See*—
Merrill, Richard E.; and Massucco, Arthur A., 4,018,939.

Arvesen, John P. Automatic shut-off circuit for eight-track tape players and the like. 4,019,202, Cl. 360-74.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Miyata, Katsuhiko, 4,019,191.
Takahashi, Yasuo, 4,018,511.

Asano, Tetuo: *See*—
Sakamoto, Yoshiyasu; Hiroshima, Tatsuo; Sakai, Toshihiko; and Asano, Tetuo, 4,019,130.

ASEA Aktiebolag: *See*—
Andersson, Conny; and Stenkvist, Sven-Einar, 4,018,974.
Elvin, Sten, 4,019,108.
Frank, Harry; and Rehnman, Kjell, 4,019,095.

Ashland Oil, Inc.: *See*—
Reynolds, Richard H., 4,018,878.

Ashton, William B.: *See*—
Mead, Theodore C.; and Ashton, William B., 4,018,693.

Aste, Fortunato, to GAF Corporation. Projector focusing mechanism. 4,018,520, Cl. 353-101.000.

Atlantic Richfield Company: *See*—
Smith, Alvin E., 4,018,697.
Wolgemuth, Larry G., 4,018,744.
Yoo, Jin Sun, 4,018,834.

Automobiles Peugeot: *See*—
Henault, Claude, 4,018,190.

Avco Corporation: *See*—
Clemmens, William B., 4,018,043.
Hurley, John F., 4,018,046.

Awerbuch, Leon: *See*—
Rogers, Alfred N.; Awerbuch, Leon; and Abrams, Jack Z., 4,018,656.

Axelrod, Norman N. Optical inspection system. 4,019,050, Cl. 250-222.00R.

Aya, Norimoto: *See*—
Kajio, Yoshihiro; and Aya, Norimoto, 4,018,474.

Ayer, Donald E.; Schlagel, Carl A.; and Flynn, Gordon L., to Upjohn Company, The. Topical clindamycin preparations. 4,018,918, Cl. 424-240.000.

Ayerst McKenna and Harrison Ltd.: *See*—
Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred, 4,018,912.

Aylott, Eric V., to Eylure Limited. Packaging of artificial eyelashes. 4,018,336, Cl. 206-460.000.

B. F. Goodrich Company, The: *See*—
Antlfinger, George J.; and Reinhart, Richard F., 4,018,966.
Fisher, John Melvin, 4,018,321.
Messerly, James William, 4,018,847.
Rastogi, Vijay; Budd, James Michael; and Koehler, Daniel Lynn, 4,018,482.

Babcock, William C.: *See*—
Burtis, Wilson A.; and Babcock, William C., 4,018,252.

Baccei, Louis J., to Loctite Corporation. Curable poly(alkylene) ether polyol-based grafted resins having improved properties. 4,018,851, Cl. 260-859.00R.

Bachman, Paul L., to Horizons Incorporated, a division of Horizons Research Incorporated. Free radical photosensitive compositions with improved sensitivity and shelf life stability. 4,018,604, Cl. 96-48.00R.

Bacvarov, Dosio C.; and Gomarac, Nicholas G., to I-T-E Imperial Corporation. Orbital disc insulator for SF_6 gas-insulated bus. 4,018,978, Cl. 174-28.000.

Badalov, Vladimir Vachaganovich: *See*—
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See*—
Fabian, Wolfgang; and Kovacs, Jenoe, 4,018,736.

Baer, Norman W.: *See*—
Sodal, Ingvar E.; Hoivik, Lars; Micco, Alexander J.; Weil, John V.; and Baer, Norman W., 4,018,241.

Baier, Kurt, to Daimler-Benz Aktiengesellschaft. Heater for vehicles. 4,018,380, Cl. 237-12.30C.

Bain, Frederick A.; and Roberts, John O. L., to Great Canadian Oil Sands Limited. Method for reducing mineral content of sludge. 4,018,664, Cl. 208-11.0LE.

Baker, Carl, to Bellack, Elizabeth I., a part interest. Reclaimed plastic material. 4,018,722, Cl. 260-2.300.

Baker, Don R., to Stauffer Chemical Company. Organotin miticidal and insecticidal compounds. 4,018,800, Cl. 260-347.200.

Baker, Don Robert, to Stauffer Chemical Company. Oxime carbonetes as fungicidal or bactericidal agents. 4,018,894, Cl. 424-301.000.

Baker, Nathaniel R.; and Lynch, Frank E., to Mountain Fuel Supply Company. Catalytic flame-type gas burner assembly and method of burning gas. 4,018,553, Cl. 431-7.000.
Baker, William Gene, to Northrop Corporation. Vehicle guidance control link utilizing light beam. 4,018,405, Cl. 244-3.140.
Bakken, Rolf: *See—*
Blom, Ole H.; and Bakken, Rolf, 4,019,034.
Bales, Robert F.: *See—*
Wells, Harold D.; Hughes, E. Warner; and Bales, Robert F., 4,017,967.
Baliozian, Mardick, to Tolec. Lighting device for photograph or motion-picture photography. 4,019,042, Cl. 240-1.300.
Ball, Douglas C., to Sunar Limited. Office chair. 4,018,479, Cl. 297-455.000.
Bandrowski, Michael, Jr., to General Motors Corporation. Insulated, high efficiency, low heat rejection, engine cylinder head. 4,018,195, Cl. 123-41.760.
Banning, Harmon W., to Weinschel Engineering Company. Coaxial transmission line with reflection compensation. 4,019,162, Cl. 333-96.000.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, to Societa' Italiana Resine S.I.R. S.p.A. Process for the production of concentrated nitric acid. 4,018,872, Cl. 423-394.000.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, to Societa' Italiana Resine S.I.R. S.p.A. Processes for the preparation of concentrated nitric acid. 4,018,873, Cl. 423-394.000.
Bare, Thomas M.; and Suh, John T., to Richardson-Merrell Inc. Pharmaceutical compositions and methods of treatment with 1-oxo-1H-2-benzothio pyran-3-carboxylic acid derivatives. 4,018,891, Cl. 424-275.000.
Barichello, Gary Douglas, to Michener Associates, Inc. Resilient sprinkler riser. 4,018,386, Cl. 239-200.000.
Barker, Gerald C., to Coherent Radiation. Lightning rod mirror protection. 4,019,154, Cl. 331-94.50T.
Barker, Kenneth L., to Amerace Corporation. Encapsulated transformer. 4,019,167, Cl. 336-96.000.
Barmeier, Harold J., Jr.: *See—*
Walters, Chester H.; Barmeier, Harold J., Jr.; and Sullivan, Greig E., 4,018,683.
Barnes, Derek: *See—*
Pike, Robert L.; and Barnes, Derek, 4,018,642.
Barnett, Allan E.: *See—*
Sinfelt, John H.; and Barnett, Allan E., 4,018,670.
Barnett, Karl F., to Cadillac Products, Inc. Heat shrink packaging. 4,018,337, Cl. 206-484.000.
Barone, Bruno J.; and Kerr, Ralph O., to Petro-Tex Chemical Corporation. Catalyst for preparing maleic anhydride from C_4 hydrocarbons. 4,018,709, Cl. 252-435.000.
Barooshian, Charles T.: *See—*
Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., 4,019,201.
Barr, Anthony J.; and Mullin, Alexander G. Apparatus and method for maximum utilization of elongated stock. 4,017,976, Cl. 33-1.00S.
Barr, Irwin R., to AAI Corporation. Solar energy collection and transfer arrangement and method, and method of assembly. 4,018,211, Cl. 126-270.000.
Barrett, Joseph J., to Allied Chemical Corporation. Spectroscopic temperature measurement. 4,018,529, Cl. 356-45.000.
Barrus, Gordon Brent, to Printronix, Inc. Print hammer energizing and control circuit. 4,019,100, Cl. 361-186.000.
Bartel, Siegfried; Payrhammer, Bernd; and Wurf, Johann, to AGFA-Gevaert, A.G. Apparatus for controlling the movements of printing filters. 4,018,527, Cl. 355-71.000.
Bartholomew, Donald D.: *See—*
Kochte, Werner W. F. K.; and Bartholomew, Donald D., 4,017,961.
Bartram, Ronald D.; and Runkle, Charles J., to Monsanto Company. Apparatus for shaping wire and ribbon structures obtained by slitting metallic coil stock. 4,018,073, Cl. 72-199.000.
BASF Aktiengesellschaft: *See—*
Burdorf, Donald L., 4,018,402.
Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, 4,018,882.
Neumann, Ute; Roller, Hermann; Hartmann, Job-Werner; Hack, Joachim; Motz, Herbert; and Ostertag, Werner, 4,018,968.
Petri, Rolf; Distler, Harry; and Bechert, Bertold, 4,018,618.
Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, 4,018,967.
BASF Wyandotte Corporation: *See—*
Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., 4,018,708.
Vogt, Herwart C.; and Patton, John T., Jr., 4,018,815.
Baslow, Floyd M. Fabric wall coverings. 4,018,260, Cl. 160-327.000.
Bassett, Norman W., to General Motors Corporation. Socket mounting cap. 4,019,045, Cl. 240-41.0BM.
Bates, James John, to National Research Development Corporation. Electrical commutators and slip-rings. 4,019,076, Cl. 310-233.000.
Battistoni, Fabrizio: *See—*
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,872.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,873.
Bauer, Andreas: *See—*
Fiala, Ernst; and Bauer, Andreas, 4,018,478.
Bauer, Johann, to Siemens Aktiengesellschaft. Electrical equipment mounting apparatus including a movable mounting member. 4,018,413, Cl. 248-214.000.
Baumann, Hans D. Perforated valve trim and method for producing the same. 4,018,245, Cl. 137-270.000.
Bausch & Lomb Incorporated: *See—*
Peck, Theodore H., 4,018,505.
Baxter Travenol Laboratories, Inc.: *See—*
Lolachi, Houshang; and Goldsmith, Herbert, 4,018,304.
Uffer, Michael B., 4,018,684.
Bayer Aktiengesellschaft: *See—*
Beck, Gunther; and Holtschmidt, Hans, 4,018,784.
Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, 4,018,924.
Burkholz, Armin; and Muller, Wolfgang Dieter, 4,018,580.
Harnisch, Horst, 4,018,796.
Jaschinski, Klemens; Fuhr, Werner; and Brandle, Karl, 4,018,262.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,018,890.
Wollweber, Hartmund; and Flucke, Winfried, 4,018,814.
Bazhenov, Sergei Nikolaevich; and Belyavsky, Efim Mordukhovich. Asymmetrical transistorized multivibrator with inductive timing circuits. 4,019,158, Cl. 331-113.00R.
BBC Brown Boveri & Company Limited: *See—*
Buxbaum, Charley; and Gessinger, Gernot, 4,019,081.
Lips, Hans-Peter, 4,019,115.
Beastrom, Ralph Emil; Bowen, Arlen John; Keller, Ronald James; and Nutt, David George, to International Business Machines Corporation. Multiplexing document card reader with convex lens. 4,019,065, Cl. 250-553.000.
Beavitt, Alan R., to Square D Company. Reed contact unit. 4,019,163, Cl. 335-154.000.
Bechert, Bertold: *See—*
Petri, Rolf; Distler, Harry; and Bechert, Bertold, 4,018,618.
Bechtel International Corporation: *See—*
Rogers, Alfred N.; Awerbuch, Leon; and Abrams, Jack Z., 4,018,656.
Shoemaker, Robert S.; Moyer, Donald H.; and Newman, Joseph J., 4,018,396.
Beck, Gunther; and Holtschmidt, Hans, to Bayer Aktiengesellschaft. Preparation of trichlorothiazole and intermediate. 4,018,784, Cl. 260-302.00R.
Beckman Instruments, Inc.: *See—*
Dzula, Gregory; Levine, Melvin; and Sperry, Elmer Ambrose, III, 4,018,089.
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Soulal, Maurice John; and Utting, Kenneth, 4,018,783.
Beeman, Robert H., to GTE Automatic Electric Laboratories Incorporated. Multifrequency signal parity detector. 4,018,991, Cl. 179-84.0VF.
Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, to Licentia Patent-Verwaltungs-G.m.b.H. Device for bonding electrodes to semiconductor devices. 4,018,373, Cl. 228-44.10A.
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Beier, Alfred, to Volkswagenwerk Aktiengesellschaft. Exhaust gas return valve actuating rod. 4,018,098, Cl. 74-470.000.
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Belanger, James A., to Belanger, Inc. Hub structure for rotary finishing wheels. 4,018,014, Cl. 51-337.000.
Belew, Robert R., to United States of America, National Aeronautics and Space Administration. Emergency descent device. 4,018,423, Cl. 254-158.000.
Belknap, Donald J. Apparatus for making incandescent lamps and the like. 4,017,956, Cl. 29-810.000.
Bell & Howell Company: *See—*
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Belyavsky, Efim Mordukhovich: *See—*
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Benda, George, to Lawrence Peska Associates, Inc., a part interest. Kit for renovating a planar surface. 4,018,332, Cl. 206-223.000.
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Hinds, Duane E.; and Ankney, Richard C., 4,018,582.
Ritsema, Irving R.; and Colpaert, James J., 4,018,310.
Benaefeld, David H., to Introl Corporation. Battery charger with automatic change from current to voltage mode control. 4,019,111, Cl. 320-23.000.
Bennett, George Thomas, to General Motors Corporation. Air flow guide mechanism. 4,018,159, Cl. 98-40.0VM.
Bente, Alfred, to Messrs. adidas Sportschuhfabriken Adi Dassler K.G. Trousers for combined training and leisure suit. 4,017,910, Cl. 2-232.000.
Bergen, Richard F.: *See*—
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Berger, Sol J. Display clip for point of purchase displays. 4,017,991, Cl. 40-128.000.
Berges, David Alan, to SmithKline Corporation. 3-Heterocyclicthiomethylcephalosporins. 4,018,759, Cl. 260-243.00C.
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Bertoldi, Attilio. Apparatus having oscillating permeable walls for fabric treatment. 4,018,068, Cl. 68-175.000.
Besson, Andre, to Thomson-CSF. Vacuum-tight seals between ceramic and aluminium components, evacuated envelopes incorporating the components sealed by said method, and vacuum tubes incorporating said envelopes. 4,019,080, Cl. 313-317.000.
Beyerlein, Fritz W., to Signetics Corporation. Semiconductor assembly and method. 4,017,963, Cl. 29-577.000.
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Bicking, John B.: *See*—
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Bieler, Hans. Braking device for skis. 4,018,455, Cl. 280-605.000.
Bierwith, Stanton F., to Great Canadian Oil Sands Limited. Method for preparing consumable electroslag guide nozzle. 4,018,861, Cl. 264-61.000.
Bigelow, Leon J. Quick release locking device. 4,018,453, Cl. 280-512.000.
Bilbee, Larry T.; and Clabaugh, Thomas L., to Gorman-Rupp Company, The. Controlled temperature fluid heater. 4,019,020, Cl. 219-302.000.
Bilsback, Malvin S., to International Business Machines Corporation. Interconnection for conductor assemblies having closely spaced conductive lines. 4,018,496, Cl. 339-17.00F.
Biocel Corporation: *See*—
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Bird, David M. Simulated hockey game goal units. 4,018,443, Cl. 273-85.00R.
Biro, David W. Electronic musical instrument. 4,018,127, Cl. 84-1.280.
Bisegna, Frank A., to Red Top Fuel Company. Apparatus for increasing the efficiency of heating systems for buildings. 4,018,381, Cl. 237-55.000.
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich. Method of producing polyhydric alcohols. 4,018,835, Cl. 260-635.00C.
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Black, Larry J., to Eli Lilly and Company. Sequential contraceptive method using two types of progestational agents. 4,018,919, Cl. 424-242.000.
Blackwood, John C., to Stepan Chemical Company. Metal fastener sticks and process of preparing same by curing polymeric binder for said under conditions of U.V. irradiation. 4,018,333, Cl. 206-343.000.
Bland, James R.; and Brunka, Rueben R., to Caterpillar Tractor Co. Frictionally held control linkage for engine throttle controls and the like. 4,018,104, Cl. 74-531.000.
Blank, Izhak, to Hydrophilics International, Inc. Sustained release polymers. 4,018,594, Cl. 71-97.000.
Blazenin, Miroslav; Rohs, Hans-Gunter; and Zeller, Bruno, to Gebr. Boehringer G.m.b.H. Apparatus for adjusting the cutting edge of a tool in a machine tool. 4,018,113, Cl. 82-2.00B.
Bloch, Herman S.; and Schmerling, Louis, to UOP Inc. Production of monochloro-substituted saturated compounds. 4,018,836, Cl. 260-648.00R.
Block, Barry; and Aine, Harry E., to Diax Corporation. Infrared laser detector employing a pressure controlled differential optoacoustic detector. 4,019,056, Cl. 250-344.000.
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Blomenkamp, Robert W., to Physics International Company. Band pass filter for impulse operation. 4,019,147, Cl. 328-167.000.
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Blount, Richard, to General Electric Company. Photoflash lamp array having shielded switching circuit. 4,019,043, Cl. 240-1.300.
Bochynsky, Frank J.; and Przybylek, George J., to Byke Co., The. Protective garment for the face. 4,017,906, Cl. 2-10.000.
Bode, Robert Euland, to Continental Oil Company. Blowout preventer testing apparatus. 4,018,276, Cl. 166-183.000.
Bodor, Nicolae S.; and Kaminski, James J., to Interx Research Corporation. Method of arresting bacterial growth with certain selected dichloro-2,2,5,5-tetrasubstituted-3-6-piperazinediones. 4,018,925, Cl. 424-250.000.
Boeke, Jan. Optical window used in device for monitoring clarity of a fluid. 4,018,513, Cl. 350-319.000.
Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., to Calgon Corporation. Corrosion inhibition with amine adducts of maleic anhydride polymers. 4,018,702, Cl. 252-389.00R.
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Bohren, Hans-Ueli: *See*—
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Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., to Hughes Aircraft Company. Optical data processing system with reflective liquid crystal light valve. 4,018,509, Cl. 350-160.0LC.
Botvin, George B., to ACS Industries, Inc. Method of making a scouring pad or the like. 4,017,949, Cl. 28-77.000.
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Boyer, Jackson S., to Sunoco Energy Development Co. Freeze-thaw method for reducing mineral content of a clay-water mixture. 4,018,682, Cl. 210-71.000.
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Brems, John Henry. Rotary and linear reversible indexing mechanism. 4,018,090, Cl. 74-52.000.
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Brigham, Roger S., deceased; and by Brigham, Loraine M., heir, to Continental Can Company, Inc. Spray-coating method. 4,018,952, Cl. 427-425.000.
Brinkmann, Ludwig; and Herwig, Walter, to Hoechst Aktiengesellschaft. Transparent copolyamides from m-xylylene diamine, an aliphatic diamine and terephthalic acid. 4,018,746, Cl. 260-78.00R.
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Brown, Joe R.; Lindsey, William C.; and Manderscheid, Phillip H., to Brown Oil Tools, Inc. Well packer apparatus. 4,018,272, Cl. 166-119.000.
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Brown, Richard E.; Puchalski, Chester; and Shavel, John, Jr., to Warner-Lambert Company. Substituted benzopyrano[3,4-c]pyridine-5-ones. 4,018,766, Cl. 260-247.20B.
Brown, Richard P., to Mount Hope Machinery Company, Incorporated. Liquid-lubricated roll with anti-flooding barriers. 4,018,302, Cl. 184-6.260.
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Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, to KMS Fusion, Inc. Multiple pass laser amplifier system. 4,019,151, Cl. 330-4.300.
Brundin, Bengt; and Trepte, Wulf, to Siemens Aktiengesellschaft. Patient's support arrangement for an X-ray apparatus. 4,019,059, Cl. 250-451.000.
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Brutsch, Werner; Behr, Michael Isaac; and Gyi, Ko Ko, to Burroughs Corporation. Method of making a transducer head with narrow core structure. 4,017,965, Cl. 29-603.000.
Bruun, Bjorn Adler Zeuthen. Press for production of a dry fodder. 4,018,149, Cl. 100-160.000.
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Burdette, James Reuben. Reinforced concrete slat floor. 4,018,188, Cl. 119-28.000.
Burdorf, Donald L., to BASF Aktiengesellschaft. Tape transport apparatus. 4,018,402, Cl. 242-192.000.
Burgess, Norman, to Thorn Electrical Industries Limited. Method of electrode mounting in high-pressure sodium discharge lamp. 4,019,078, Cl. 313-217.000.
Burkart, Oskar, to Marker, Hannes. Device for damping vibration of a ski. 4,018,454, Cl. 280-602.000.
Burkholz, Armin; and Muller, Wolfgang Dieter, to Bayer Aktiengesell-

schaft. Separator for separating liquid droplets from a stream of gas. 4,018,580, Cl. 55-321.000.

Burns, James A., to Airco, Inc. Automatic switchover valve and system utilizing same. 4,018,244, Cl. 137-113.000.

Burroughs Corporation: *See—*
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Burtis, Wilson A.; and Babcock, William C. Anti-pollution nozzle assembly. 4,018,252, Cl. 141-45.000.

Bushick, Ronald D.; and Angstadt, Howard P., to Sun Ventures, Inc. Ammoxidation catalyst. 4,018,713, Cl. 252-464.000.

Busta, Francis F.; Schmidt, Bruce E.; and McKay, Larry L., to University of Minnesota, The Regents of the. Method of production and recovery of protein from food wastes. 4,018,650, Cl. 195-28.00R.

Butcher, Roger Anthony, to Aerosol Inventions & Development S.A. AIDSA. Valve actuators for pressurized dispensers. 4,018,365, Cl. 222-402.110.

Buttarelli, Luigi, to Prodotti Gianni S.r.l. Product for activating and potentiating vegetable metabolism and for conditioning agricultural soil and method for the preparation thereof. 4,018,591, Cl. 71-23.000.

Buxbaum, Charley; and Gessinger, Gernot, to BBC Brown Boveri & Company Limited. Reaction cathode. 4,019,081, Cl. 313-346.00R.

Buyniski, Joseph Paul; Jelenevsky, Alex Michael; and Buchanan, Ronald Leslie, to Bristol-Myers Company. Anti-arrhythmic agents. 4,018,767, Cl. 260-247.20A.

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Cal Crown Corporation: *See—*
Dice, S. Virgil, Jr.; and Lobdell, Harry R., 4,018,143.

Calabro, Anthony D. Circuit board mounting device. 4,019,099, Cl. 361-399.000.

Caldwell, Frank J.; and Heckman, Thomas B., to Hobart Corporation. Tray washer apparatus. 4,018,239, Cl. 134-143.000.

Caldwell, John C.: *See—*
Saunders, Dennis L.; and Caldwell, John C., 4,018,685.

Calgon Corporation: *See—*
Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., 4,018,702.
Ralston, Paul Hotchkiss; and Boffardi, Bennett Patsy, 4,018,701.

Callahan, Harold E. Mounting for power toothbrush. 4,017,934, Cl. 15-176.000.

Camco, Incorporated: *See—*
Logan, Francis D., 4,018,115.

Campbell, Carl D.: *See—*
Kinsell, Robert C.; Noe, James C.; and Campbell, Carl D., 4,018,060.

Campbell, Joseph K. Pipe stress/strain neutralizer. 4,018,463, Cl. 285-166.000.

Canadian Chromalox Company, Limited, The: *See—*
Svekis, Imants J., 4,018,982.

Canno, Leonard E., to Equitable Bag Co., Inc. Box-bag with permanently secured handle. 4,018,142, Cl. 93-35.00H.

Cannon, Robert L. Electronic metronome. 4,018,131, Cl. 84-484.000.

Canon Denshi Kabushiki Kaisha: *See—*
Taniguchi, Tadasu; Hosaka, Iwao; and Kato, Shigehiro, 4,019,025.

Canon Kabushiki Kaisha: *See—*
Kagami, Isao, 4,019,075.
Taniguchi, Tadasu; Hosaka, Iwao; and Kato, Shigehiro, 4,019,025.

Canon Seiki Kabushiki Kaisha: *See—*
Kagami, Isao, 4,019,075.

Canova, Levy A., to SCM Corporation. Selective hydrogenation of α-pinene to cis-pinane. 4,018,842, Cl. 260-675.500.

Canto, Elio D.; and Padovani, Albert H. Method for regenerating glucose oxidase reagent. 4,018,651, Cl. 195-103.50C.

Cape, Arthur T., to Coast Metals, Inc. Method of and apparatus for hard facing poppet valves. 4,019,011, Cl. 219-76.000.

Capetti, Raffaele, to A. Tonolli & C. S.p.A. Process for obtaining skeins of wire rod of a weight which is a multiple of that of a wirebar. 4,018,376, Cl. 228-158.000.

Capuano, Antonio, to SIGMA S.p.A. Device for pressing Louis shoe heels. 4,017,929, Cl. 12-16.400.

Capuano, Antonio, to Sigma S.p.A. Universal device for pressing soles on shoes. 4,017,930, Cl. 12-33.000.

Carbone, Emil L.: *See—*
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,599.
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,630.

Carborundum Company, The: *See—*
Anderson, Ralph A., 4,018,023.

Cargill, N. Allen, to Mohawk Data Sciences Corporation. Ballistic print hammer assembly. 4,018,155, Cl. 101-93.330.

Carlisle Corporation: *See—*
Frazee, Ray D., 4,018,298.

Carlson, David H. J.; and Urban, Peter, to Universal Oil Products Company. Reactivation of a spent liquid phthalocyanine catalytic composite. 4,018,705, Cl. 252-411.00R.

Carlson, James E.; and Urmston, Robert E. Method and apparatus for sleep induction. 4,018,218, Cl. 128-1.00C.

Carnahan, Robert D.: *See—*
Youtsey, Karl J.; Holt, William C., Jr.; Carnahan, Robert D.; and Spielberg, David H., 4,018,943.

Carr, Charles E. Valve. 4,018,248, Cl. 137-514.300.

Carr, Clifford H. Springless ball valve for high speed compressors. 4,018,247, Cl. 137-512.100.

Carr, Robert Joseph: *See—*
Hermanson, Gerald Peter; Rickel, David Murray; and Carr, Robert Joseph, 4,017,955.

Carrier Corporation: *See—*
Cunningham, Kenneth K.; and Herb, Carl C., 4,018,160.
Patnode, Marvin M.; and Leonard, Louis H., 4,018,583.

Carson, Donald W.: *See—*
Carson, Earl L.; and Carson, Donald W., 4,018,543.

Carson, Earl L.; and Carson, Donald W., to Raymond Lee Organization, Inc., The, a part interest. Whirlwind power system. 4,018,543, Cl. 415-2.000.

Carter, Lewis D. Mailbox signal device. 4,018,379, Cl. 232-35.000.

Casey, James P., to Microfibres, Inc. Method of making a differentially shrunk flocked fabric, and flocked fabric product. 4,018,956, Cl. 428-86.000.

Cason, Charles M., III, to United States of America, Army. Device for measuring energy transfer rates during lasing. 4,018,535, Cl. 356-218.000.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Raabe, Thomas; Scholtholt, Josef; and Nitz, Rolf-Eberhard, 4,018,778.

Cassia, Antonio Macchi, to Steiner American Corporation. Soap dispenser. 4,018,363, Cl. 222-80.000.

Caterpillar Tractor Co.: *See—*
Bland, James R.; and Brunka, Rueben R., 4,018,104.
Chamberlain, Richard W., 4,018,103.
Hasselbacher, Roland E., 4,018,295.
Latimer, Robert M., 4,018,424.

Cates, Raymond H., Jr.; Martin, Walter L., Jr.; and Smith, Sumpter D., to PPG Industries, Inc. Environmental control of bushing. 4,018,586, Cl. 65-2.000.

Catlin, Benjamin John; and Williams, Tegwyn Pierce, to Thomas J. Lipton, Inc. Comminuted meat product and method of preparing same. 4,018,935, Cl. 426-646.000.

Caudill, Allison Holland: *See—*
Abbott, Jerry Joe; and Caudill, Allison Holland, 4,018,187.

Centre d'Etude et de Realisation en Informatique Appliquee - C.E.R.I.A.: *See—*
Cour, Jean M.; and Suchard, Jean F., 4,019,176.

Centre d'Etudes pour l'Industrie Pharmaceutique: *See—*
Amselem, Armand, 4,018,786.

Ceres Ecology Corporation: *See—*
Seckler, David W.; Harper, Judson M.; and Gaynor, William Wayne, 4,018,899.

Ceskoslovenska akademie ved: *See—*
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, 4,018,659.

Chaivre, Joseph W.; and Jadach, Albert A., to Towne Robinson Fastener Company. Capped wheel nut. 4,018,133, Cl. 85-35.000.

Chalupsky, Paul A., to FMC Corporation. Material handling equipment operator's cab mounting. 4,018,473, Cl. 296-28.00C.

Chamberlain, Richard W., to Caterpillar Tractor Co. Control linkage mechanism. 4,018,103, Cl. 74-519.000.

Chamberlain, Savvas Georgiou; and Heller, Lawrence Griffith, to International Business Machines Corporation. Highly sensitive charge-coupled photodetector including an electrically isolated reversed biased diffusion region for eliminating an inversion layer. 4,019,199, Cl. 357-24.000.

Champion, Gordon: *See—*
Zambuto, Domenic A.; and Champion, Gordon, 4,019,069.

Chan, David Cheong King, to Chevron Research Company. 3-Halohydrocarbylthio-1,2,3-benzoxathiazin-4-(3H)-one 2-oxides. 4,018,920, Cl. 424-246.000.

Chandler Evans Inc.: *See—*
Fitzgerald, Robert Edward; and Kampe, Robert Frederick, 4,018,384.

Chang, David R., to General Electric Company. Metal of improved environmental resistance. 4,018,569, Cl. 428-678.000.

Chang, Harry L., to Mobil Oil Corporation. Oil recovery by waterflooding with improved mobility control. 4,018,281, Cl. 166-273.000.

Chang, Wen-Hsuan; Scriven, Roger L.; and Prucnal, Paul J., to PPG Industries, Inc. Polyurethane polyol compositions modified with an alkylenimine. 4,018,849, Cl. 260-849.000.

Charles Stark Draper Laboratory, Inc., The: *See—*
Cox, Duncan B., Jr.; and Lee, William H., 4,019,153.

Chartbrand, John H.: *See—*
Gariepy, Frank J., Sr., 4,018,130.

Chartbrand, Robert E.: *See—*
Gariepy, Frank J., Sr., 4,018,130.

Chebowski, Jerome E., to Rees, Inc. Indicator light and testing circuit. 4,019,128, Cl. 324-21.000.

Chemcut Corporation: *See—*
Goffredo, Daniel L., 4,017,982.
Chemische Fabrik Budenheim Rudolf A. Oetker: *See—*
Beltz, Klaus; Frankenfeld, Klaus; and Gotzmann, Karl, 4,018,869.
Chemische Industrie AKU-Goodrick B.V.: *See—*
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Chemische Werke Huls Aktiengesellschaft: *See—*
Jahnentz, Walter; Klatt, Friedhard; and Gaupp, Karl, 4,018,621.
Chenot, Charles F., to GTE Sylvania Incorporated. Cerium stabilized magnesium aluminum gallate phosphors. 4,018,698, Cl. 252-301.40R.
Chevron Research Company: *See—*
Chan, David Cheong King, 4,018,920.
Holm, Melvin M., 4,018,667.
Sweeney, William A.; and Simic, Milutin, 4,018,657.
Chew, Otto F., Jr.; and Hinshaw, Louis W. Ring whirling device. 4,018,444, Cl. 273-109.000.
Chowning, John M., to Leland Stanford Junior University, The Board of Trustees of. Method of synthesizing a musical sound. 4,018,121, Cl. 84-1.010.
Christensson, Od Wikar, to Christenssons Maskiner & Patenter AB. Arrangement for vacuum packing of foodstuffs and the like. 4,018,030, Cl. 53-124.00B.
Christenssons Maskiner & Patenter AB: *See—*
Christensson, Od Wikar, 4,018,030.
Christophel, Reuben L., to Shenandoah Manufacturing Company, Inc. Forced air convector/heater fireplace grate structure. 4,018,210, Cl. 126-164.000.
Christy, Marcia Elizabeth, to Merck & Co., Inc. Phenylthioaralkylamines. 4,018,830, Cl. 260-570.900.
Chrysler Corporation: *See—*
Schmidt, Howard, 4,018,632.
Chu, Joseph Y. C., to Xerox Corporation. Method for in situ fabrication of photoconductive composite. 4,018,602, Cl. 96-1.500.
Chute, Robert E.: *See—*
Bowes, Emmerson; and Chute, Robert E., 4,018,831.
Chvertko, Anatoli Ivanovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich, 4,018,973.
Chyung, Kenneth, to Corning Glass Works. Transparent beta-quartz glass-ceramics. 4,018,612, Cl. 106-39.700.
Ciba-Geigy AG: *See—*
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Ciba-Geigy Corporation: *See—*
Creighton, Gordon Robert, 4,017,953.
Gupton, John T., III; Jelenevsky, Alex M.; Miyazaki, Teruko U.; and Petree, Harris E., 4,018,771.
Liechti, Hans Wilhelm; and Defago, Raymond, 4,018,558.
Moser, Peter; and Nicopoulos, Alex, 4,018,763.
Cicci, George B.; and Tufts, Guy O., to International Harvester Company. Method for harvesting crops using a tractor-pulled crop harvester. 4,018,036, Cl. 56-1.000.
Cimarusti, Christopher M.; Wojtkowski, Paul; and Dolfini, Joseph E., to E. R. Squibb & Sons, Inc. Thio-β-lactam cephalosporins. 4,018,760, Cl. 260-243.00C.
Cimarusti, Christopher M.; Wojtkowski, Paul; and Dolfini, Joseph E., to E. R. Squibb & Sons, Inc. Thio-β-lactam cephalosporins. 4,018,761, Cl. 260-243.00C.
Cimarusti, Christopher M.: *See—*
Varma, Ravi K.; and Cimarusti, Christopher M., 4,018,757.
Varma, Ravi K.; and Cimarusti, Christopher M., 4,018,774.
Cincinnati Milacron, Inc.: *See—*
Tanner, Randall Curtis, 4,019,035.
Clabaugh, Thomas L.: *See—*
Bilbee, Larry T.; and Clabaugh, Thomas L., 4,019,020.
Clapp, Roy A. Composite photography apparatus and method utilizing a polarizing beam splitting unit. 4,018,519, Cl. 352-89.000.
Clark Equipment Company: *See—*
Duttarer, Ralph M.; and Hushower, Richard R., 4,018,141.
Thomas, Robert L., 4,018,319.
Clark, Gary E.; and Miller, Art J., to Sun Electric Corporation. System for maintaining a diesel engine. 4,018,086, Cl. 73-119.00A.
Clayton, Malcolm; and Grimshaw, Keith, to English Card Clothing Company Limited, The. Textile carding. 4,017,942, Cl. 19-106.00R.
Cleare, Peter John Vernon, to Imperial Chemical Industries Limited. Process of preparing alkenes. 4,018,838, Cl. 260-654.00R.
Cleeland, Roy, Jr.; Grunberg, Emanuel; Leimgruber, Willy; and Weigele, Manfred, to Hoffmann-La Roche Inc. Fluorogenic materials and labeling techniques. 4,018,884, Cl. 424-7.000.
Clemmens, William B., to Avco Corporation. Gas turbine engines with toroidal combustors. 4,018,043, Cl. 60-39.270.
Coast Metals, Inc.: *See—*
Cape, Arthur T., 4,019,011.
Cobb, John M.: *See—*
Mitchell, Edward; and Cobb, John M., 4,018,194.
Cobbledick, David Stanley, to General Tire & Rubber Company, The. Flame retardant flexible urethane foams. 4,018,724, Cl. 260-2.5AB.
Cochran, Chudleigh B., to Brown Oil Tools, Inc. Well packer. 4,018,274, Cl. 166-129.000.
Cochran Western Corporation: *See—*
Duerksen, Arnold, deceased, 4,019,003.
Coggiola, James P., to General Electric Company. Self-cleaning steam iron. 4,017,988, Cl. 38-77.830.
Cohen, Hilda. Shoulder bag clasp. 4,017,944, Cl. 24-86.00R.
Cohen, Marvin P.; Shavel, John, Jr.; and Von Strandtmann, Max, to Warner-Lambert Company. Substituted (4-oxo-4H-1-benzopyran-2-yl)cyclopropane carboxylic acids and esters. 4,018,798, Cl. 260-345.200.
Coherent Radiation: *See—*
Barker, Gerald C., 4,019,154.
Cold Fasteners, Inc.: *See—*
Jack, James A., 4,018,257.
Cole, Edward L.; and Hess, Howard V., to Texaco Inc. Treatment of solid fuels. 4,018,571, Cl. 44-1.00R.
Cole, James Arlen, to Cabot Corporation. Method of producing tube rods and articles produced therefrom. 4,019,019, Cl. 219-146.000.
Collette, Roderick E., to Pawling Rubber Corporation. Ventilated interlocking floor tile. 4,018,025, Cl. 52-590.000.
Collins, Franklyn M., to Airco, Inc. Bilayer thin film resistor and method for manufacture. 4,019,168, Cl. 338-309.000.
Colpaert, James J.: *See—*
Ritsema, Irving R.; and Colpaert, James J., 4,018,310.
Columbian Art Works, Inc.: *See—*
Norris, H. Coleman; and Kelly, Gordon D., 4,017,993.
Combustion Engineering, Inc.: *See—*
Formanek, Frank Joseph; and Leshem, Adam, 4,018,345.
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Comiskey, Gary F.; Hesse, Gregory N.; and Bovenlander, Johannes Peter, to Sun Electric Corporation. Analog oscilloscope. 4,019,127, Cl. 324-16.00S.
Command-Aire Corporation: *See—*
Kay, Herbert M., 4,018,266.
Compagnie Francaise de Raffinage: *See—*
Michaux, Jean-Pierre; and Arnaud, Guy, 4,018,843.
Concors, Arthur: *See—*
Anderson, Anders, 4,018,449.
Condon, Michael E.; Hauck, Frederic P.; and Reid, Joyce, to E. R. Squibb & Sons, Inc. Phenylpiperazinotetrahydronaphthols and derivatives. 4,018,773, Cl. 260-268.0PH.
Cone, Clarence D., Jr. Process for control of cell division. 4,018,649, Cl. 195-1.800.
Conklin, Thomas H.; and Singer, Barry M., to North American Philips Corporation. Pyroelectric vidicon having a protective covering on the pyroelectric target. 4,019,084, Cl. 313-388.000.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, to Warner-Lambert Company. 2-Aryl substituted isoxazolo(2,3-alpha)pyridinyl halides. 4,018,781, Cl. 260-297.00B.
Conrad-Stork B.V.: *See—*
Hupkes, Leonard, 4,018,349.
Consolidated Video Systems, Inc.: *See—*
Long, Ronald D.; Swain, Allan L.; and Lyon, Thomas C., 4,018,990.
Construction Mills-K: *See—*
Coppel, Georges, 4,018,347.
Construction Technology, Inc.: *See—*
Lance, Raymond E.; and James, Ronald N., 4,018,135.
Continental Aluminum Products Company: *See—*
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Continental Can Company, Inc.: *See—*
Brigham, Roger S., deceased; and Brigham, Loraine M., heir, 4,018,952.
Kent, Ronald I.; and Brown, Albert R., 4,018,377.
Continental Group, Inc., The: *See—*
Ostrem, Obert M., 4,018,357.
Continental Oil Company: *See—*
Bode, Robert Euland, 4,018,276.
Contois, Lawrence E.; Kaukeinen, Joseph Y.; Michel, Stephen; and Plutchak, Thomas M., to Eastman Kodak Company. Organic azo pigment sensitizers for photoconductive layers. 4,018,606, Cl. 96-1.700.
Contois, Lawrence E., to Eastman Kodak Company. Crystalline organic pigment sensitizers for photoconductive layers. 4,018,607, Cl. 96-1.700.
Control Data Corporation: *See—*
Lincoln, Neil R.; and Resnick, David R., 4,019,144.
Cook, Michael M.: *See—*
Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., 4,018,702.
Coors Container Company: *See—*
Myers, James Lewis, 4,018,185.
Coppel, Georges, to Construction Mills-K. Display cabinet. 4,018,347, Cl. 214-16.00B.
Corax Corporation: *See—*
Manson, Morris, 4,018,488.
Cornell, Edward P.; and Lipo, Thomas A., to General Electric Company. Controlled current induction motor drive. 4,019,105, Cl. 318-227.000.
Corning Glass Works: *See—*
Chyung, Kenneth, 4,018,612.
Kerko, David J.; and Seward, Thomas P., III, 4,018,965.
Martin, Francis W., 4,018,613.
Nordlie, Lawrence A., 4,018,614.
Correia, Yves; and Lesparre, Jean, to Rhone-Progil. Method of purifying hydrogen chloride gas. 4,018,880, Cl. 423-488.000.
Cosden Technology, Inc.: *See—*
Teer, Glenn E.; Higgins, Jerry G.; Warren, George D.; and Ewert, Donald C., 4,018,737.
Costache, Corneliu Vladut: *See—*
Teodorescu, Constantin; and Costache, Corneliu Vladut, 4,018,554.

Cotter, Robert James; Keogh, Michael John; and Heitz, William Donald, to Union Carbide Corporation. Cross-linked, water insoluble poly(N-glycidyl-piperazine). 4,018,721, Cl. 260-2.00A.

Coulter Electronics, Inc.: *See*—
Hogg, Walter R., 4,019,134.

Cour, Jean M.; and Suchard, Jean F., to Centre d'Etude et de Realisation en Informatique Appliquee - C.E.R.I.A. System and method for reliable communication of stored messages among stations over a single common channel with a minimization of service message time. 4,019,176, Cl. 340-172.500.

Cowan, Toby J.: *See*—
Pearce, Peter J.; and Cowan, Toby J., 4,018,408.

Cox, Duncan B., Jr.; and Lee, William H., to Charles Stark Draper Laboratory, Inc., The. Digital phase-locked loop filter. 4,019,153, Cl. 331-1.00A.

Coy, David Howard: *See*—
Schally, Andrew Victor; and Coy, David Howard, 4,018,726.

Cragoe, Edward J., Jr.; Bicking, John B.; and Smith, Robert L., to Merck & Co., Inc. 9-Thia- and oxothia- and 9-dioxothia-11,12-seco-prostaglandins and processes. 4,018,802, Cl. 260-399.000.

Cramer, Charles Robert; vanLenthe, Gerrit Dirk; and Maier, Dietmar, to Metalorgana Etablissement. Non-yellowing antimicrobial compositions comprising diiodomethyl sulfones. 4,018,611, Cl. 106-15.00R.

Creighton, Gordon Robert, to Ciba-Geigy Corporation. Heat exchangers. 4,017,953, Cl. 29-157.30V.

Crise, W. Paul. Cleaner using intermittent jets of fluid supplied at above ambient pressure. 4,017,938, Cl. 15-346.000.

Critten, Donald Louis; and Johnson, Peter Alan, to Kent Instruments Limited. Correlators. 4,019,038, Cl. 235-181.000.

Crown Cork & Seal Company, Inc.: *See*—
Urban, Joseph J.; and Hoenes, Robert H., 4,018,151.

Cryomedics, Inc.: *See*—
Wallach, Ronald M., 4,018,227.

CTS Corporation: *See*—
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Cubic Productron Inc.: *See*—
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Cuniberti, Mario; and Pinsenschaum, Edwin C., to Owens-Illinois, Inc. Article transfer apparatus. 4,018,342, Cl. 214-1.0BT.

Cunningham, Frank M.: *See*—
Shufflebarger, Earl D.; Kish, Edward E.; Cunningham, Frank M.; Boylan, John R.; and Murauskas, Donald J., 4,018,686.

Cunningham, Kenneth K.; and Herb, Carl C., to Carrier Corporation. Air conditioning terminal. 4,018,160, Cl. 98-40.00D.

Cunningham, McCleery B., to Sonoco Products Company. Yarn tube with slant cut end. 4,018,401, Cl. 242-118.300.

Curry, Byron V.; and Bonkowski, Teofil L., to Curry et al., Byron V. Heat installed multi-pack carrier machine. 4,018,027, Cl. 53-48.000.

Curry et al., Byron V.: *See*—
Curry, Byron V.; and Bonkowski, Teofil L., 4,018,027.

Curry, Leonard O. Radiographic examination apparatus. 4,019,063, Cl. 250-523.000.

Curtiss-Wright Corporation: *See*—
Berkowitz, Murray, 4,018,548.

Cutler, Norman W., Jr.; and Sorli, Duncan C., to Polaroid Corporation. Photographic apparatus for processing large format, self-developing film unit. 4,019,194, Cl. 354-312.000.

D'Agostini, Candido: *See*—
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,872.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,873.

Dahl, Gustav Lennart: *See*—
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Daigle, Donald J.: *See*—
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Daimler-Benz Aktiengesellschaft: *See*—
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Schrape, Peter; and Worner, Gunter, 4,018,320.

Dale Electronics, Inc.: *See*—
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Danchenko, Mikhail Evgenievich: *See*—
Osintsev, Vladislav Grigorievich; Naumov, Jury Grigorievich; Esibyan, Eduard Migranovich; Danchenko, Mikhail Evgenievich; and Malkin, Vasily Berkovich, 4,018,375.

Daniel, Wilbur Lee, to Dresser Industries, Inc. Well logging pad devices having selective differential relief. 4,019,125, Cl. 324-1.000.

Daniel Woodhead, Inc.: *See*—
Eckart, George R., 4,018,492.

Danneman, Douglas L.; and Yetter, Jerry J., to Procter & Gamble Company, The. Amide-stabilized dry powder aerosol antiperspirant compositions and method of preparation. 4,018,887, Cl. 424-47.000.

Davenport, Joseph A.: *See*—
Raith, Richard L.; and Davenport, Joseph A., 4,018,019.

Daviduk, Nicholas; Lewis, David W.; and Siuta, Michael T., to Mobil Oil Corporation. Process for in situ retorting of oil shale. 4,018,280, Cl. 166-266.000.

Davis, John E.; and McAvoy, Thomas R., to Minnesota Mining and Manufacturing Company. Low density abrasive article. 4,018,575, Cl. 51-295.000.

Davis, Oliver Thurston; Jones, Norman Ray; and Eddy, Elmer Carl. Electromagnetic motor and generator. 4,019,103, Cl. 318-37.000.

Davis, Paul K., to Pacific Roller Die Co., Inc. End recorrugator. 4,018,072, Cl. 72-106.000.

Dawson, Daniel J.: *See*—
Gless, Richard D., Jr.; Dawson, Daniel J.; and Wingard, Robert E., 4,018,826.

Dayron Corporation: *See*—
Hermanson, Gerald Peter; Rickel, David Murray; and Carr, Robert Joseph, 4,017,955.

DeCaro, Charles J., to Textron, Inc. Installation tool apparatus. 4,018,254, Cl. 144-32.00R.

Dee, Edward. Combination confection and holder. 4,018,902, Cl. 426-75.000.

Deeg, Wyman L., to C. P. Clare & Company. Memory matrix. 4,019,164, Cl. 335-112.000.

Deep River Armory, Inc.: *See*—
Hughes, James B., Jr., 4,017,995.

Defago, Raymond: *See*—
Liechti, Hans Wilhelm; and Defago, Raymond, 4,018,558.

Deinego, Jury Borisovich: *See*—
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Deknatel, Inc.: *See*—
Kurtz, Leonard D.; and Bidwell, Robert E., 4,018,224.

Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., to A. Christiaens Societe Anonyme. 3-Loweralkylcarbamylsulfonamido-4-phenylaminopyridine-N-oxides, derivatives thereof and pharmaceutical compositions containing same. 4,018,929, Cl. 424-263.000.

DeLorenzo, Joseph; DiFranco, Julius V.; and Scire, Frank J., to United States of America, Army. Radar signal processor. 4,019,182, Cl. 343-7.00A.

Demko, Paul R.; Washabaugh, Frank J.; and Williams, Robert H., to National Starch and Chemical Corporation. Corrugating adhesive compositions containing thermoplastic polymer, thermosetting resin, and starch. 4,018,959, Cl. 428-182.000.

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Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Pyridyl substituted aminoalkyl-thioureas and ureas. 4,018,928, Cl. 424-263.000.
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Ford, Reginald Arthur: *See—*
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Formanek, Frank Joseph; and Leshem, Adam, to Combustion Engineering, Inc. Surface traversing apparatus. 4,018,345, Cl. 214-1.0BB.

Forney, Albert J.: *See—*
Johnson, Glenn E.; Neilson, Harry B.; Forney, Albert J.; and Haynes, William P., 4,018,654.

Forrester, Harold C.; and Tatum, Harold E., to Louisville Bedding Company. Thread-tensioning mechanism for the stop motion means of a multi-needle sewing machine. 4,018,175, Cl. 112-254.000.

Foster Grant Co., Inc.: *See—*
Sims, Willard M., 4,018,731.

Foster, James R., to Franklin Manufacturing Company. Slipping belt clutch. 4,018,096, Cl. 74-230.010.

Foster, Raymond Keith: *See—*
Rankins, Everett V.; and Foster, Raymond Keith, 4,018,294.

Foulkes, Peter H., to Quaker Oats Company, The. Semi-moist pet food containing corn molasses. 4,018,909, Cl. 426-532.000.

Fountain, William D.; and Johnson, Bertram C., to United States of America, Energy Research and Development Administration. Active/passive mode-locked laser oscillator. 4,019,156, Cl. 331-94.5ML.

Foxboro Company, The: *See—*
Fletcher, Kenneth S., III; Earle, William E.; and Weiner, Jay M., 4,018,565.

Francel, Josef; and Lemke, Galen D., to Owens-Illinois, Inc. Arc suppression in a cathode ray tube. 4,018,717, Cl. 252-513.000.

Franceschi, Giovanni: *See—*
Foglio, Maurizio; Masi, Paolo; Suarato, Antonino; and Franceschi, Giovanni, 4,018,776.

Frangopol, Victor: *See—*
Manoliu, Victor; Lutescu, Andrei; Ionescu, Gheorghe; Heretoiu, Silviu; Frangopol, Victor; and Petru, Lucuta, 4,018,082.

Frank, Harry; and Rehnman, Kjell, to ASEA Aktiebolag. Capacitor equipment. 4,019,095, Cl. 361-79.000.

Frankenfeld, Klaus: *See—*
Beltz, Klaus; Frankenfeld, Klaus; and Gotzmann, Karl, 4,018,869.

Franklin Manufacturing Company: *See—*
Foster, James R., 4,018,096.

Fraser, Andrew S. Signature protection system. 4,017,994, Cl. 40-2.200.

Fraser, Douglas S., to FTS Systems Inc. Freeze dryer. 4,017,983, Cl. 34-92.000.

Frazee, Ray D., to Carlisle Corporation. Wheel assembly with slip clutch. 4,018,298, Cl. 180-76.000.

Frazier, Gene F., to Versar, Inc. Infra red photography with silver halide films using infrared and visible light exposures. 4,018,608, Cl. 96-27.00E.

Freeman, Gerald C., to Pitney-Bowes, Inc. Tape handling apparatus utilizing tangential web contact for postage meter. 4,018,153, Cl. 101-93.000.

Freitag, Walter O., to Sperry Rand Corporation. Connector device. 4,018,495, Cl. 339-17.00L.

Freund, Michael C.: *See—*
Seider, Gene J.; Freund, Michael C.; and Duffy, James R., 4,019,022.

Frey, Oscar J. Trouble lamp for mechanics. 4,019,047, Cl. 240-54.00A.

Frick, Richard H., to Kimberly-Clark Corporation. Diaper folder and stacker mechanism. 4,018,432, Cl. 270-61.00R.

Fricke, Hans-Jurgen; Nonnenmacher, Gerhard; Robeller, Walter; and Kersten, Gunter, to Robert Bosch G.m.b.H. Piston machine construction. 4,018,137, Cl. 91-488.000.

Fried, Josef, to University of Chicago, The. Chemical synthesis. 4,018,820, Cl. 260-514.00D.

Friedman, Robert; and Lesher, Howard D., to Dimetrics, Inc. Welding control systems. 4,019,016, Cl. 219-125.00R.

Friedrich, Robert E.; and Hess, Robert L., to Westinghouse Electric Corporation. Grounded-tank high-power compressed-gas circuit-interrupter. 4,019,007, Cl. 200-148.00B.

Fritschi, Klaus-Peter: *See—*
Roll, Karl; and Fritschi, Klaus-Peter, 4,018,292.

FTS Systems Inc.: *See—*
Fraser, Douglas S., 4,017,983.

Fuchs, Friedrich: *See—*
Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, 4,018,967.

Fuhr, Werner: *See—*
Jaschinski, Klemens; Fuhr, Werner; and Brandle, Karl, 4,018,262.

Fuji, Masanobu; and Suzuki, Kuniomi, to Taisei Kensetsu Kabushiki Kaisha. Large lightweight gypsum article and a process for the production thereof. 4,018,963, Cl. 428-294.000.

Fuji Photo Film Co., Ltd.: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 4,018,610.
Ohmura, Hiroshi, 4,019,190.

Fuji Photo Optical Co., Ltd.: *See—*
Sakai, Yutaka, 4,018,512.

Fujii, Shinichi: *See—*
Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, 4,018,710.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, 4,018,772.

Fujita, Tadashi: *See—*
Yamanashi, Bill Soichro; and Fujita, Tadashi, 4,019,203.

Fukuda, Atsushi: *See—*
Hiramatsu, Takashi; Oe, Akihiko; Fukuda, Atsushi; Fuse, Masaki; and Mori, Tatsujiro, 4,019,036.

Fukushima, Osamu; Nagoshi, Kazuo; and Iwamoto, Toshiaki, to Kuraray Co., Ltd. Sheet material. 4,018,954, Cl. 428-86.000.

Funakubo, Shinnosuke. Sleeve for use in a meat chopper. 4,018,390, Cl. 241-82.500.

Furucz, Istvan. Carburation system for an internal combustion. 4,018,199, Cl. 123-127.000.

Fuse, Masaki: *See—*
Hiramatsu, Takashi; Oe, Akihiko; Fukuda, Atsushi; Fuse, Masaki; and Mori, Tatsujiro, 4,019,036.

Futamura, Kazumasa: *See—*
Konishi, Masami; and Futamura, Kazumasa, 4,018,049.

Gabano, Jean-Paul: *See—*
Jumel, Yves; and Gabano, Jean-Paul, 4,018,970.

GAF Corporation: *See—*
Aste, Fortunato, 4,018,520.
Werner, Jesse; and Rugg, Gordon R., 4,018,957.

Gahn, Randall F.: *See—*
Sheibley, Dean W.; and Gahn, Randall F., 4,018,971.

Galarowic, Lawrence A.; Waineo, Glenn B.; and Johnson, David F., to Visi-Trol Engineering Company. Means for producing a dual acceleration-deceleration movement for a transfer shuttle. 4,018,328, Cl. 198-741.000.

Gall, James W.; and Johnston, Everett L., to Phillips Petroleum Company. Controlled well plugging with dilute polymer solutions. 4,018,286, Cl. 166-295.000.

Gallacher, Lawrence V., to King Industries, Inc. Solvent-extraction process for recovery and separation of metal values. 4,018,865, Cl. 423-24.000.

Galler, William J. Safety frame for weight lifting. 4,018,442, Cl. 272-123.000.

Gallwitz, Gerhard: *See—*
Liebrandt, Gunnar; Hagel, Adolf; and Gallwitz, Gerhard, 4,018,065.

Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,018,928.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,018,931.

Gantois, Michel: *See—*
Michel, Henri; and Gantois, Michel, 4,019,064.

Garbutt, John T.; Malzahn, Ronald C.; and Morehouse, Alpha L., to Grain Processing Corporation. Gluten treatment. 4,018,936, Cl. 426-656.000.

Gariepy, Frank J., Sr., to Chartbrand, John H.; and Chartbrand, Robert E., a part interest to each. Snare assembly. 4,018,130, Cl. 84-415.000.

Garrett Corporation, The: *See—*
Kinsell, Robert C.; Noe, James C.; and Campbell, Carl D., 4,018,060.

Garrett, Wayne O., to Berry, William. Device for dressing grinding wheels. 4,018,207, Cl. 125-11.00B.

Garrison, Judd F., to John Thomas Batts, Inc. Accessory for article display tally. 4,017,990, Cl. 40-322.000.

Gartner, Todd Henry, to Motorola, Inc. High energy adaptive ignition via digital control. 4,018,202, Cl. 123-148.00E.

Gates, James L.: *See—*
Adkins, Larry R.; and Gates, James L., 4,019,200.

Gattuso, Marion J.: *See—*
Arnold, Robert J.; and Gattuso, Marion J., 4,018,855.

Gaughan, Edmund J., to Stauffer Chemical Company. N-carbamoyl ethyl oxanilates. 4,018,813, Cl. 260-471.00A.

Gaupp, Karl: *See—*
Jahnentz, Walter; Klatt, Friedhard; and Gaupp, Karl, 4,018,621.

Gaut, Robert T. Anchoring device for well tools. 4,018,275, Cl. 166-137.000.

Gautschi, Fritz: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; and Stoll, Max, 4,018,910.

Gay, David. Omnidirectional air driven power generating system. 4,018,051, Cl. 60-398.000.

Gaynor, William Wayne: *See—*
Seckler, David W.; Harper, Judson M.; and Gaynor, William Wayne, 4,018,899.

Gazda, Imre I., to Otis Engineering Corporation. Selective bomb hanger. 4,018,277, Cl. 166-214.000.

Geay, Gilbert Louis, to Menuiserie du Val de Rhins R. Boucher S.A. Stairs. 4,018,300, Cl. 182-178.000.

Gebelius, Sven Runo Vilhelm. Pump device for flow rate control of liquid in a piping system. 4,018,546, Cl. 417-313.000.

Gebr. Boehringer G.m.b.H.: *See—*
Blazenin, Miroslav; Rohs, Hans-Gunter; and Zeller, Bruno, 4,018,113.

Gebr. Hofmann KG: *See—*
Wenz, Friedrich, 4,018,087.
Wenz, Friedrich, 4,019,136.

Gehm, Horst; Gratzke, Werner; and Linden, Wilhelm, to Siemens Aktiengesellschaft. Circuit arrangement for an inverter. 4,019,117, Cl. 321-45.00R.

Geisslinger, Wolfgang: *See—*
Ungnadner, Peter; and Geisslinger, Wolfgang, 4,018,517.

Geisthoff, Hubert; and von Allworden, Wilhelm, to Jean Walterscheid GmbH. Tractor three-point connection having leaf springs. 4,018,451, Cl. 280-461.00A.

General Dynamics Corporation: *See—*
Palmer, John P., 4,017,962.

General Electric Company: *See—*
Blount, Richard, 4,019,043.
Chang, David R., 4,018,569.
Coggiola, James P., 4,017,988.
Cornell, Edward P.; and Lipo, Thomas A., 4,019,105.
Dinger, Edward H.; Saben, David G.; and VanPatten, John R., 4,019,094.
Giaever, Ivar, 4,018,886.
Hale, Thomas E., 4,018,631.
Hatch, Burton D., 4,018,059.
Heartz, Robert A., 4,017,985.
Hoffman, Herbert N., 4,018,083.
Schultz, William J., 4,017,950.
Wallot, George P., 4,019,102.
Wright, John H., 4,018,564.

General Foods Corporation: *See—*
Parliment, Thomas Holden, 4,018,934.
Scarpellino, Richard J., 4,018,907.

General Motors Corporation: *See—*
Bandrowski, Michael, Jr., 4,018,195.
Bassett, Norman W., 4,019,045.
Bennett, George Thomas, 4,018,159.
Dempsey, John E.; and Meinke, Russell F., 4,018,032.
Fattic, Gerald T., 4,019,120.
Hawkins, Harold G., 4,018,981.
Klomp, Edward D., 4,018,193.
Mason, William T., Jr., 4,018,472.
McQuinn, Ted M.; and Anderson, Richard B., 4,018,316.
O'Brien, Patrick H.; and Zabritski, William J., 4,018,099.
Vona, Nick, Jr.; and Sisson, Kenneth O., 4,018,067.
Williamitis, Victor A., 4,018,061.

General Signal Corporation: *See—*
Engle, Thomas H., 4,018,140.

General Tire & Rubber Company, The: *See—*
Cobbledick, David Stanley, 4,018,724.

Genik-Sas-Berezowsky, Roman Michael, to Sherritt Gordon Mines Limited. Production of copper by gaseous reduction. 4,018,595, Cl. 75-.50A.

Genzer, Jerome D.: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,018,762.

Geometric Data Corporation: *See—*
Levine, Marshall S., 4,018,643.

George Kent Limited: *See—*
Leach, Robert J., 4,018,077.

George, Stanley Ross. Beverage belt. 4,018,371, Cl. 224-26.00R.

Georges, Andre H.: *See—*
Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., 4,018,929.

Georgia-Pacific Corporation: *See—*
Neal, John A., 4,018,691.

Geppert, Albrecht: *See—*
Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, 4,018,373.

Gerard, Raymond R.: *See—*
Archer, Wesley L.; Simpson, Elbert L.; and Gerard, Raymond R., 4,018,837.

Gerry, Martin E. Stepping motor having rotational and counter rotational magnetic field control. 4,019,110, Cl. 318-696.000.

Gertsch AG: *See—*
Gertsch, Ulrich, 4,018,456.

Gertsch, Ulrich, to Gertsch AG. Ski binding with release plate. 4,018,456, Cl. 280-618.000.

Gesing, Horst: *See—*
Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, 4,018,373.

Gessinger, Gernot: *See—*
Buxbaum, Charley; and Gessinger, Gernot, 4,019,081.

Giaever, Ivar, to General Electric Company. Diagnostic method and device employing protein-coated magnetic particles. 4,018,886, Cl. 424-12.000.

Gienko, Vladimir Ivanovich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Gilbert, Edward O.: *See—*
Dixon, George Scott; Gilbert, Edward O.; Oliver, Theodore A.; and Wilson, James W. A., 4,019,107.

Gilg, Lawrence E.: *See—*
Person, Herman R.; and Gilg, Lawrence E., 4,019,086.

Gillette Company, The: *See—*
Elmi, Stelio Jack, 4,018,225.

Giordano, Benjamin B., to Litton Business Systems, Inc. Document imprinter. 4,018,156, Cl. 101-106.000.

Girling Limited: *See—*
Hart, John; and Pride, Clifford John, 4,018,313.
Raffauf, Alois; and Wolfle, Eduard, 4,019,012.
Tickle, Colin John Frederick, 4,018,311.

Girmes-Werke A.G.: *See—*
Fennekels, Peter; and Schutze, Herbert, 4,018,066.

Givaudan Corporation: *See—*
Ochsner, Paul Albert; and Schenk, Hanspeter, 4,018,718.

Gladstone, Roland Aaron, to International Telephone and Telegraph Corporation. Conductive probe level control. 4,019,067, Cl. 307-118.000.

Glaesel, Gottfried, to Hego Electric G.m.b.H. Terminal block retaining member. 4,018,502, Cl. 339-198.0GA.

Glaser, Heinz: *See—*
Rusch, Dieter; Glaser, Heinz; and Lubcke, Otto, 4,018,397.

Gleason, John Gerald, to SmithKline Corporation. Substituted phenylglycylcephalosporins. 4,018,921, Cl. 424-246.000.

Glenn, Coy F.: *See—*
Murphy, John R., 4,018,050.

Glenn, Edward C. Dowel pin positioner. 4,017,972, Cl. 32-11.000.

Gless, Richard D., Jr.; Dawson, Daniel J.; and Wingard, Robert E., to Dynapol Corporation. Process for preparing polyvinylamine and salts thereof. 4,018,826, Cl. 260-583.00P.

Glover, Donald J.: *See—*
Hoffsommer, John C.; Kaplan, Lloyd A.; Kubose, Donald A.; and Glover, Donald J., 4,018,676.

Glover, Douglas Wade: *See—*
Herrmann, Henry Otto, Jr.; and Glover, Douglas Wade, 4,018,977.

Glover, Leon Conrad, Jr.: *See—*
Lopez, Eugene Francis; Glover, Leon Conrad, Jr.; and Lyons, Bernard John, 4,018,733.

Glover, Richard Donovan. Method for transfer color printing. 4,018,557, Cl. 8-1.0XB.

Gnyp, Andrew; and Elert, Karl, to Jos. Schlitz Brewing Company. Apparatus for spin flanging containers. 4,018,176, Cl. 113-1.00G.

Goff, Edward W. High speed precision metal cutting saw assembly. 4,018,118, Cl. 83-167.000.

Goffredo, Daniel L., to Chemcut Corporation. Drying apparatus. 4,017,982, Cl. 34-31.000.

Golborn, Peter; and Duffy, James J., to Hooker Chemicals & Plastics Corporation. Dialkyl alkyl and cyclic phosphoramidomethyl phosphonates. 4,018,560, Cl. 8-190.000.

Gold, Joseph. Adjustable display unit. 4,018,340, Cl. 211-44.000.

Golden, Preston L., to Jonathan-Alan Corporation, The. Liquid filled insoles. 4,017,931, Cl. 12-146.00B.

Golden, William R.: *See—*
Kolinger, Kenneth J.; Williams, Norman E.; Earley, Donald M.; and Golden, William R., 4,018,270.

Goldhaber, Marvin L. Tamper resistant fastener and tool for operating same. 4,018,111, Cl. 81-71.000.

Goldsmith, Herbert: *See—*
Lolachi, Houshang; and Goldsmith, Herbert, 4,018,304.

Gomarac, Nicholas G.: *See—*
Bacvarov, Dosio C.; and Gomarac, Nicholas G., 4,018,978.

Goodman, Walter P.; and DePas, Laddie A., to W. M. Cissell Manufacturing Company. Hanger conveying system. 4,018,327, Cl. 198-723.000.

Goodyear Aerospace Corporation: *See—*
Egbert, William D.; and McDonald, Wilson C., 4,018,589.

Goodyear Tire & Rubber Company, The: *See—*
Saracsan, Jeffrey W.; and Sandstrom, Paul H., 4,018,948.

Goosen, Carl C. Surgical punch apparatus. 4,018,228, Cl. 128-305.000.

Gordon Clothes, Inc.: *See—*
DiBenedetto, Ernest A.; and Lerner, Harold S., 4,018,174.

Gorman-Rupp Company, The: *See—*
Bilbee, Larry T.; and Clabaugh, Thomas L., 4,019,020.

Gorog, Istvan; and Knox, Joseph Dale, to RCA Corporation. Acousto-optic modulated laser. 4,019,155, Cl. 331-94.50M.

Gotz, Manfred: *See—*
Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred, 4,018,912.

Gotzmann, Karl: *See—*
Beltz, Klaus; Frankenfeld, Klaus; and Gotzmann, Karl, 4,018,869.

Gould Inc.: *See—*
Seider, Gene J.; Freund, Michael C.; and Duffy, James R., 4,019,022.

Gould, James S.; and Gould, Samuel, to Indicator Controls Corporation. Adapter unit for pedestrian traffic control signal. 4,019,170, Cl. 340-119.000.

Gould, Samuel: *See—*
Gould, James S.; and Gould, Samuel, 4,019,170.

Goyal, Prashant K.: *See—*
Ruffo, Angelo P.; and Goyal, Prashant K., 4,018,646.

Gracovetsky, Serge: *See—*
Lucas, John M.; and Gracovetsky, Serge, 4,019,066.

Graham, John W.; Salathiel, William M.; Gruesbeck, Clay; and Muecke, Thomas W., to Exxon Production Research Company. Method and apparatus for gravel packing wells. 4,018,282, Cl. 166-278.000.

Graham, John W.: *See—*
Watkins, Larry A.; Graham, John W.; and Salathiel, William M., 4,018,285.

Grain Processing Corporation: *See—*
Garbutt, John T.; Malzahn, Ronald C.; and Morehouse, Alpha L., 4,018,936.

Grampp, Friedrich: *See—*
Mundel, Gunter; and Grampp, Friedrich, 4,018,251.

Gratzke, Werner: *See—*
Gehm, Horst; Gratzke, Werner; and Linden, Wilhelm, 4,019,117.

Grau, Thomas George, to Bell Telephone Laboratories, Incorporated. Metallic plating testing apparatus. 4,019,129, Cl. 324-30.00R.

Graves, Howard T., to United States of America, Army. Remote infrared signal communicator. 4,019,180, Cl. 343-6.0ND.

Great Canadian Oil Sands Limited: *See—*
Anderson, Joseph C., 4,018,665.
Bain, Frederick A.; and Roberts, John O. L., 4,018,664.
Bierwith, Stanton F., 4,018,861.

Greenberg, Howard. Jump-rope training exercise device. 4,018,441, Cl. 272-75.000.

Greenfield, Harold: *See—*
Malz, Russell E., Jr.; Brown, Robert W.; and Greenfield, Harold, 4,018,747.

Greune, Christian; Herrmann, Bruno; and Steuer, Siegfried, to Motoren- und Turbinen-Union Munchen GmbH. Regulating device for a prime mover, more particularly for a single-spool gas turbine. 4,018,045, Cl. 60-39.28R.

Griffiths, Donald Eric; and Norton, David Gibbons, to International Business Machines Corporation. Fluidic transducer access opening in a stack of flexible record disks. 4,019,204, Cl. 360-99.000.

Grimshaw, Keith: *See—*
Clayton, Malcolm; and Grimshaw, Keith, 4,017,942.

Grinberg, Jan: *See—*
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,018,509.

Grob & Co. Aktiengesellschaft: *See—*
Vogelbacher, Erich, 4,017,948.

Gross, George E. Vacuum treatment to remove vaporized liquid from unfrozen cellular substances while keeping the cell walls thereof intact. 4,018,908, Cl. 426-281.000.

Gross, James R., to Dow Chemical Company, The. Absorbent articles and methods for their preparation. 4,018,951, Cl. 427-401.000.

Grotnes Machine Works, Inc.: *See—*
Fencl, Vernon, 4,018,634.

Grove, Earl I. Kickless resistance welding cable and method of making the same. 4,018,976, Cl. 174-19.000.

Grovesteen, William R.: *See—*
Le Boeuf, Albert R.; and Grovesteen, William R., 4,018,853.

Grubb, Daniel Baker, to AMP Incorporated. Tool for gang crimping ribbon coaxial cable. 4,017,954, Cl. 29-749.000.

Gruber, Wilhelm; and Schroeder, Guenter, to Rohm GmbH. Method for making α-hydroxy-isobutyramide from acetone cyanohydrin. 4,018,829, Cl. 260-561.00B.

Gruendler Crusher & Pulverizer Co.: *See—*
Dreyer, Fredrick B., 4,017,957.

Gruesbeck, Clay: *See—*
Graham, John W.; Salathiel, William M.; Gruesbeck, Clay; and Muecke, Thomas W., 4,018,282.

Grumman Aerospace Corporation: *See—*
Lawrence, Robert J.; Devaney, John; and Tramontano, Dominick, 4,019,166.

Grunberg, Emanuel: *See—*
Cleeland, Roy, Jr.; Grunberg, Emanuel; Leimgruber, Willy; and Weigele, Manfred, 4,018,884.

GTE Automatic Electric Laboratories Incorporated: *See—*
Beeman, Robert H., 4,018,991.

GTE Laboratories Incorporated: *See—*
Zambuto, Domenic A.; and Champion, Gordon, 4,019,069.

GTE Sylvania Incorporated: *See—*
Chenot, Charles F., 4,018,698.
Kam, George H., 4,019,160.
Klein, Arthur H., 4,019,093.
Woodman, Douglas P., 4,019,060.

Guardian Electric Manufacturing Company: *See—*
Wright, William W., 4,019,165.

Gudelis, David A.: *See—*
Reid, Lloyd E.; and Gudelis, David A., 4,018,666.

Gueant, Auguste; and Mercier, Serge, to Produits Chimiques Ugine Kuhlmann. Method for preparing fatty acids from their corresponding soaps. 4,018,805, Cl. 260-413.000.

Guichesseux, Gerard Pierre: *See—*
Jacob, Pascal Marie Henri; and Guichesseux, Gerard Pierre, 4,018,335.

Guitoneau, Hans Edward: *See—*
Acda, Petrus Marinus; and Guitoneau, Hans Edward, 4,018,464.

Gulf Research & Development Company: *See—*
Heilman, William J.; and Lynch, Thomas J., 4,018,695.
Lakshmanan, Pallavoor R., 4,018,732.
Manley, Robert E.; and McCoy, John D., 4,019,133.
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,018,828.

Gulf & Western Metals Forming Company: *See—*
Tischler, Henry J., 4,017,922.

Gupton, John T., III; Jelenevsky, Alex M.; Miyazaki, Teruko U.; and Petree, Harris E., to Ciba-Geigy Corporation. Process for the production of 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidines. 4,018,771, Cl. 260-251.00R.

Gurubatham, Vincent Paulraj: *See—*
Marcade, Roque Denis; and Gurubatham, Vincent Paulraj, 4,018,147.

Gute, Robert M., to Midland-Ross Corporation. Bus door switch apparatus. 4,019,004, Cl. 200-61.430.

Gutman, Arnold D., to Stauffer Chemical Company. Isourea acetylphosphate insecticides. 4,018,917, Cl. 424-200.000.

Gutridge, Jack E.; and Marulic, Walter J., to Pullman Incorporated. Combination seat and berth. 4,018,166, Cl. 105-316.000.

Gyi, Ko Ko: *See—*
Brutsch, Werner; Behr, Michael Isaac; and Gyi, Ko Ko, 4,017,965.

Gym-Dandy, Inc.: *See—*
Smyrni, Emanuel S.; and White, Bobbie L., 4,018,538.

H. H. Robertson Company: *See—*
Hadley, John F., 4,018,725.

Haar, Wilheim: *See—*
Fischer, Wilfried; Kleinschmager, Herbert; Haar, Wilheim; Weddigen, Gert; and Rohr, Franz-Josef, 4,018,969.

Haas, David J., to U.S. Philips Corporation. Electrophotographic x-ray device. 4,019,052, Cl. 250-274.000.

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Haber, Terry M. Calibration system for magnetic switches used in wrist instruments. 4,018,078, Cl. 73-1.00D.

Hack, Joachim: *See—*
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Hadley, John F., to H. H. Robertson Company. Phenolic foam products and method of making the same. 4,018,725, Cl. 260-2.50F.

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Hagel, Adolf: *See—*
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Hagenbach, Robert J., to Xerox Corporation. Electrostatographic magnetic brush imaging process employing carrier beads comprising high purity nickel. 4,018,601, Cl. 96-1.0SD.

Haines, Richard F., to United States of America, National Aeronautics and Space Administration. Optical instrument employing reticle having preselected visual response pattern formed thereon. 4,018,533, Cl. 356-171.000.

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Haldi, Bernhard A., to Raymond Lee Organization, Inc., The, a part interest. Device for folding sheets and the like. 4,018,368, Cl. 223-37.000.

Hale Fire Pump Company: *See—*
Eberhardt, H. Alfred, 4,018,544.

Hale, Thomas E., to General Electric Company. Coated cemented carbide product. 4,018,631, Cl. 148-31.500.

Hallerberg, Karl J., to Borg-Warner, GmbH. Wedging free-wheel clutch. 4,018,318, Cl. 192-41.00A.

Hallstrom, James R.; Hoffman, Raymond J.; and Walling, Ronald L., to Rexnord Inc. Method of applying a wearing surface. 4,018,944, Cl. 427-140.000.

Hamacher, Martin. Junction piece for electrical leads. 4,018,500, Cl. 339-103.00R.

Hamada, Hideo: *See—*
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Hamada, Sadanori; Tsutaki, Kunio; and Hashimoto, Hiroyuki, to Nippon Electric Company, Ltd. Coupled-cavity type traveling-wave tube with sever termination attenuators. 4,019,087, Cl. 315-3.500.

Hamakawa, Genjiro; and Naito, Kenji, to Honda Giken Kogyo Kabushiki Kaisha. Fuel increase system for engine. 4,018,856, Cl. 261-23.00A.
Hamilton, David, to Tom Lauderdale Machine Shop, Inc., a part interest. Hot air andiron. 4,018,208, Cl. 126-121.000.
Hammer, Jacob Meyer, to RCA Corporation. Fiber-optic to planar-waveguide optical coupler. 4,018,506, Cl. 350-96.00C.
Hanold, William E., to National Union Electric Corporation. Hose coupling for a suction cleaner. 4,017,937, Cl. 15-327.00R.
Hansen, Barton G.: *See*—
Sauer, Gale E.; and Hansen, Barton G., 4,018,020.
Hansen, Elo Harald; and Ruzicka, Jaromir, to Zellweger Uster AG. Gas electrode. 4,018,660, Cl. 204-195.00R.
Hanson, Herbert G., to Vapor Corporation. Valve and seal assembly therefor. 4,018,417, Cl. 251-63.500.
Hardin, K. Dan, to United States of America, Energy Research and Development Administration. Gas injected vacuum switch. 4,019,079, Cl. 313-231.400.
Hardy, Charles R., Jr., to Ecolaire Incorporated. Method and apparatus for handling slag handling. 4,018,588, Cl. 65-19.000.
Hardy, Peter D., to Metal Box Company Limited, The. Variable length reciprocating conveyor system for spacing articles. 4,018,326, Cl. 198-461.000.
Harnisch, Horst, to Bayer Aktiengesellschaft. Monomethine dyestuffs. 4,018,796, Cl. 260-343.20R.
Harper, Judson M.: *See*—
Seckler, David W.; Harper, Judson M.; and Gaynor, William Wayne, 4,018,899.
Harris, Donald S., to Overhead Door Corporation. Drawbar arm for door operator. 4,018,005, Cl. 49-199.000.
Harris, George M., to Harris-Hub Co., Inc. Metal crib structure. 4,017,918, Cl. 5-100.000.
Harris-Hub Co., Inc.: *See*—
Harris, George M., 4,017,918.
Hart, John; and Pride, Clifford John, to Girling Limited. Vehicle brake wedge actuator assemblies. 4,018,313, Cl. 188-343.000.
Hartl, Carroll P.: *See*—
Johnson, Charles H.; and Hartl, Carroll P., 4,017,940.
Hartman, James Keith. Energy conversion device. 4,019,113, Cl. 321-1.500.
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Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., to System Development Corporation. Method and apparatus for scrambling and unscrambling communication signals. 4,019,201, Cl. 358-124.000.
Harwood, Leopold Albert, to RCA Corporation. Third harmonic signal generator. 4,019,118, Cl. 321-65.000.
Harwood, Leopold Albert; and Wittmann, Erwin Johann, to RCA Corporation. Bias circuit for junction diodes. 4,019,152, Cl. 330-29.000.
Hasbro Development Corporation: *See*—
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Hasegawa, Shinichi: *See*—
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Hashimoto, Yoshio: *See*—
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Hassan, Javathu K.; Rabstejnek, Carl V.; and Wutka, Anthony D., to International Business Machines Corporation. Precision tool and workpiece positioning apparatus with ringout detection. 4,019,015, Cl. 219-121.0EB.
Hasselbacher, Roland E., to Caterpillar Tractor Co. Vehicle equalizer bar mounting means. 4,018,295, Cl. 180-9.500.
Hatch, Burton D., to General Electric Company. Cryogenic fluid transfer joint employing gaseous seals. 4,018,059, Cl. 62-55.000.
Hauck, Frederic P.: *See*—
Condon, Michael E.; Hauck, Frederic P.; and Reid, Joyce, 4,018,773.
Haupt, Robert C., to Allis-Chalmers Corporation. Four-piece fan shroud. 4,018,297, Cl. 180-54.00A.
Hauserman, Inc.: *See*—
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Havener, John W.: *See*—
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Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.
Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, to Ono Pharmaceutical Co., Ltd. 16-methylene-prostaglandin compounds. 4,018,812, Cl. 260-468.00D.
Hayashibara Biochemical Laboratories, Incorporated: *See*—
Miyake, Toshio, 4,018,233.
Hayes-Albion Corporation: *See*—
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Hayes, John C.; and Pollitzer, Ernest L., to UOP Inc. Hydrocarbon conversion with an acidic multimetallic catalytic composite. 4,018,669, Cl. 208-139.000.
Hayes, John C.: *See*—
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Haynes, James R., to Kayot, Inc. Apparatus for Loran simulation. 4,019,183, Cl. 343-103.000.
Haynes, William P.: *See*—
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Hayssen Manufacturing Co.: *See*—
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Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., to Quaker Oats Company, The. Food bars having fortified marshmallow base. 4,018,900, Cl. 426-72.000.
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., to Quaker Oats Company, The. Stabilized high protein food bar. 4,018,901, Cl. 426-72.000.
Hazar, Mitchell M., to American Denture Corporation. Modular prosthetic dentures. 4,017,971, Cl. 32-2.000.
Heartz, Robert A., to General Electric Company. Multisensor digital image generator. 4,017,985, Cl. 35-10.400.
Heaton, James W.; Warren, Donald W.; and Albrecht, Albert B., to Kennametal Inc. Machine tool having a special indexable turret and method of operation. 4,018,112, Cl. 82-1.00C.
Heckman, Thomas B.: *See*—
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Hego Electric G.m.b.H.: *See*—
Glaesel, Gottfried, 4,018,502.
Heidrich, Gunter, to AGFA-Gevaert, A.G. Apparatus for applying indica on photographic paper or the like. 4,018,152, Cl. 101-45.000.
Heiermann, Klaus; Pohler, Carl-Ludwig; and Bertenburg, Joachim, to Th. Kieserling & Albrecht. Device on peeling machine. 4,018,114, Cl. 82-20.000.
Heilman, William J.; and Lynch, Thomas J., to Gulf Research & Development Company. Polymer-modified automatic transmission fluid. 4,018,695, Cl. 252-73.000.
Hein, Leopold A.; and Myers, William N. Solar heating and cooking apparatus. 4,018,212, Cl. 126-270.000.
Heitz, William Donald: *See*—
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Hellsten, Karl Martin Edvin; and Karlsson, Birgit Tora Gunvor, to Berol Kemi AB. Liquid detergent composition. 4,018,696, Cl. 252-89.00R.
Hemmeter, John H. Mattress guard. 4,017,919, Cl. 5-317.00R.
Henault, Claude, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Method of and apparatus for feeding hydrogen fuel to engines. 4,018,190, Cl. 123-3.000.
Henderson, Cyril, to American Safety Equipment Corporation. Vehicle inertia sensors. 4,018,400, Cl. 242-107.40A.
Hennig, Kurt. Power feed chain. 4,018,411, Cl. 248-49.000.
Hensel, Otis O. Apparatus for draining whey from cheese. 4,018,145, Cl. 99-458.000.
Herb, Carl C.: *See*—
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Heretoiu, Silviu: *See*—
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Hermann Rappold & Co. GmbH: *See*—
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Hermanson, Gerald Peter; Rickel, David Murray; and Carr, Robert Joseph, to Dayron Corporation. Apparatus for attaching a workpiece to a continuous length of line. 4,017,955, Cl. 29-564.800.
Herms, Gunter, to Dynamit Nobel Aktiengesellschaft. Jalousie element. 4,018,259, Cl. 160-26.000.
Hernandez, Carmen T. Cooling blanket. 4,017,921, Cl. 5-347.000.
Hernandez, Reginaldo A. Dip stick cleaner. 4,017,935, Cl. 15-210.00B.
Herrmann, Bruno: *See*—
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Herrmann, Henry Otto, Jr.; and Glover, Douglas Wade, to AMP Incorporated. High voltage cable with air dielectric. 4,018,977, Cl. 174-24.000.
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Herrmann, Manfred Franz Reinhold: *See*—
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Hester, Jackson B., Jr., to Upjohn Company, The. 6-(o-Halophenyl)-1-methyl-4H-s-triazolo[4,3-a][1,4]-benzodiazepine. 4,018,788, Cl. 260-308.00R.
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Higgs, William York, to Intercontinental Marine Limited. Life saving equipment for vessels. 4,017,924, Cl. 9-14.000.
Highberg, Carle W.; and Dolido, John, to Engelhard Minerals & Chemicals Corporation. Machine for dressing fixed-super-abrasive tools. 4,018,206, Cl. 125-11.0CD.
Hijikata, Akiko: *See—*
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Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., to Engelhard Minerals & Chemicals Corporation. Electrical contacts of dispersion strengthened gold. 4,018,599, Cl. 75-165.000.
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., to Engelhard Minerals & Chemicals Corporation. Method of preparation of dispersion strengthened silver electrical contacts. 4,018,630, Cl. 148-11.50P.
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Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, to Fuji Photo Film Co., Ltd. Supersensitized silver halide photographic emulsion. 4,018,610, Cl. 96-124.000.
Hinds, Duane E.; and Ankney, Richard C., to Bendix Corporation, The. Vent tube means for a cryogenic container. 4,018,582, Cl. 62-50.000.
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Hiramatsu, Yoshio: *See—*
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Hofmann, Hans-Joachim, to Durr - Dental KG. Apparatus for producing dry compressed air. 4,018,579, Cl. 55-213.000.
Hogan, Gerard T., to UOP Inc. Adjustable height front edge for vehicle seat. 4,018,477, Cl. 297-284.000.
Hogg, Walter R., to Coulter Electronics, Inc. Particle detector independent of errors caused by changes of electrolyte conductivity and electrode polarization. 4,019,134, Cl. 324-71.0CP.
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Hollander, Ralph. End-pin holder for string instruments. 4,018,129, Cl. 84-294.000.
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Hollingsead, Robert Allen; and Pryor, Clyde Robert, to Hollingsead-Pryor Enterprises, Inc. Pivotable extractor hold down apparatus. 4,018,091, Cl. 74-89.150.
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Howell, George C. Playground apparatus. 4,018,435, Cl. 272-33.00R.
Hsu, Nelson N., to Lockheed Aircraft Corporation. Acoustic emissions simulator. 4,018,084, Cl. 73-71.50R.
Huellwegen, Josef, to Nixdorf Computer AG. Circuit arrangement for the ungrounded transmission of signals through testing points in communication facilities. 4,019,114, Cl. 321-2.000.
Hughes Aircraft Company: *See—*
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,018,509.
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Hughes, James B., Jr., to Deep River Armory, Inc. Range finding sight. 4,017,995, Cl. 42-1.00S.
Hughes, Randall E.; and Jordan, Edward P., to Thiele Kaolin Company. Centrifuge processing of high-solids clay. 4,018,673, Cl. 209-5.000.
Hunt, Stephen M.: *See—*
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Hupkes, Leonard, to Conrad-Stork B.V. Transhipment installation, particularly for containers. 4,018,349, Cl. 214-87.000.
Hurley, John F., to Avco Corporation. Infrared radiation suppressor for gas turbine engine. 4,018,046, Cl. 60-264.000.
Hushower, Richard R.: *See—*
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Hutchinson, Donald P.; and Vandersluis, Kenneth L., to United States of America, Energy Research and Development Administration. Method and apparatus for tuning high power lasers. 4,019,157, Cl. 331-94.50C.
Hyatt, John A., to Eastman Kodak Company. Novel complexing agents derived from cyclotriveratrylene. 4,018,832, Cl. 260-613.00B.
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I-T-E Imperial Corporation: *See—*
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Imler, Vaughn R., to PPG Industries, Inc. Fluid spraying apparatus for tempering glass sheets. 4,018,590, Cl. 65-348.000.
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Salmond, Kent A.; and Pejcha, Ivan, 4,019,205.
Ingvaldsen, Bernt. Process for drying young grass and similar products and an apparatus for carrying out the process. 4,017,981, Cl. 34-26.000.
Inoue, Akira; Horie, Koshi; Saito, Koichi; Aoki, Yukio; Ono, Tetsuji; and Ohara, Takashi, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Catalysts for purifying exhaust and waste gases. 4,018,706, Cl. 252-430.000.
Inouye, Ken; Shin, Masaru; and Watanabe, Kunio, to Shionogi & Co., Ltd. Polypeptides with ACTH-like activities. 4,018,753, Cl. 260-112.50R.
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Insolio, Thomas A., to Fletcher-Terry Company, The. Glass cutting method and apparatus. 4,018,372, Cl. 225-2.000.
Institut Pasteur: *See—*
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Jackson, James A., Sr. Road maintenance machine. 4,018,540, Cl. 404-95.000.
Jacob, Pascal Marie Henri; and Guichesseux, Gerard Pierre, to Societe Anonyme pour l'Equipement Electrique des Venicules S. E. V. Marchal. Display package. 4,018,335, Cl. 206-422.000.
Jacobsen, Ralph O. Controlled hay bale metering and feeding device. 4,018,391, Cl. 241-152.00A.
Jacobson, Alexander D.: *See—*
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Jahnentz, Walter; Klatt, Friedhard; and Gaupp, Karl, to Chemische Werke Huls Aktiengesellschaft. Method for removing slag cakes from synthesizing gas reactors. 4,018,621, Cl. 134-5.000.
Jakusch, Helmut: *See—*
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Jarvis, James Dean, to Safety Steel Service, Inc. Abrasive recovery system. 4,018,329, Cl. 198-743.000.
Jaschinski, Klemens; Fuhr, Werner; and Brandle, Karl, to Bayer Aktiengesellschaft. Heat exchange with gas/solids mixtures. 4,018,262, Cl. 165-1.000.
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Joby, Michael John; and Maker, Paul Manwaring, to Lucas Industries Limited. Electronic fuel control for a gas turbine engine. 4,018,044, Cl. 60-39.16R.
John Dennis (Graphics) Limited: *See—*
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Johne, Hans; Jentzsch, Arndt; and Rudolph, Otfried, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Printing machine with sheet-transfer arrangement. 4,018,161, Cl. 101-231.000.
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Johnson, Francis; Paul, Kenneth G.; and Favara, Duccio, to Dow Chemical Company, The. Intermediates for prostaglandins. 4,018,797, Cl. 260-343.30R.
Johnson, Glenn E.; Neilson, Harry B.; Forney, Albert J.; and Haynes, William P., to United States of America, Energy Research and Development Administration. Pretreatment of coal during transport. 4,018,654, Cl. 201-9.000.
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Johnson, Michael R.; and Plattner, Jacob J., to Pfizer Inc. 3-Aminomethylene-6,7-dimethoxy-2-methyl-4-oxo-1,2,3,4-tetrahydro-1-quinoline carboxylic acid esters and intermediates leading thereto. 4,018,758, Cl. 260-240.300.
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Johnson, Wesley Grant. Saliva ejector and chin holder therefor. 4,017,975, Cl. 32-33.000.
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Jones, Robert S.; Jones, Wesley E.; and Smathers, Harry W. Flooring system. 4,018,271, Cl. 165-175.000.
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Jordan, Robert Kenneth. Ammonium oxalate process. 4,018,875, Cl. 423-419.00R.
Jordan, Robert Kenneth. Process for the production of metal oxalates and soda ash. 4,018,876, Cl. 423-421.000.
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Jumel, Yves; and Gabano, Jean-Paul, to Saft-Societe des Accumulateurs Fixes et de Traction. Electric cell. 4,018,970, Cl. 429-162.000.
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Kaetterhenry, Lorell D. Hydraulic apparatus for controlling movement of a member under loading. 4,018,136, Cl. 91-420.000.
Kafesjian, Ralph R.; Masse, Norman G.; and Keller, David P., to American Hospital Supply Corporation. Heart valve with a sintered porous surface. 4,017,911, Cl. 3-1.500.
Kagami, Isao, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha. Ironless rotor windings of rotary coils in miniature electric machines. 4,019,075, Cl. 310-206.000.
Kagerhuber, Franz: *See—*
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Kageyama, Takao; and Kato, Hiroshi, to Nippon Electric Company, Ltd. Wideband multi-cavity velocity modulation tube. 4,019,089, Cl. 315-5.430.

Kahn, Leonard R. Compatible AM stereophonic receivers. 4,018,994, Cl. 179-15.0BT.
Kahn, Leonard R. Communication network protection system. 4,018,996, Cl. 179-84.0VF.
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Kajitani, Akira, to Toshikiyo Shiraki. Decorative sheet. 4,017,992, Cl. 40-138.000.
Kajiware, Takao: *See—*
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Kallies, Henrik. Induction air-conditioning apparatus. 4,018,268, Cl. 165-86.000.
Kalopissis, Gregoire; and Bugaut, Andree, to Societe Anonyme dite: L'Oreal. Hair dye compounds. 4,018,556, Cl. 8-10.100.
Kam, George H., to GTE Sylvania Incorporated. Signal attenuator circuit for TV tuner. 4,019,160, Cl. 333-81.00R.
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Kanamaru, Hisanobu: *See—*
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Kaufman, Seth Ian. Home vacuum apparatus for freezer bags. 4,018,253, Cl. 141-65.000.
Kauk, Reinhold J. Training device for ice skaters. 4,018,439, Cl. 272-70.300.
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Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, to Kureha Kagaku Kogyo Kabushiki Kaisha; and NGK Insulators, Ltd. Method of repairing injured portion of refractory furnace-lining. 4,017,960, Cl. 29-401.00E.
Kawagoe, Hiroto: *See—*
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Kay, Herbert M., to Command-Aire Corporation. Building fresh air ventilator system. 4,018,266, Cl. 165-12.000.
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Keegan, Thomas E. Board game. 4,018,446, Cl. 273-136.00F.
Kees, George, Jr.; and Hickmann, Horst R., to Kees Surgical Specialty Company. Bracket for an operating table. 4,018,412, Cl. 248-214.000.
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Keizer, Eugene Orville, to RCA Corporation. Video disc record having spirally aligned sync storage locations. 4,018,984, Cl. 358-128.000.
Keizer, Eugene Orville, to RCA Corporation. Video disc playback apparatus. 4,018,987, Cl. 358-128.000.
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Keller, David P.: *See—*
Kafesjian, Ralph R.; Masse, Norman G.; and Keller, David P., 4,017,911.
Keller, Leonard J., to Keller Corporation, The. Method and apparatus for controlled fracturing of subterranean formations. 4,018,293, Cl. 175-4.500.
Keller, Ronald James: *See—*
Beastrom, Ralph Emil; Bowen, Arlen John; Keller, Ronald James; and Nutt, David George, 4,019,065.
Kelley, William L. Apparatus and method for schedule monitoring and control. 4,019,027, Cl. 235-89.00R.
Kelly, Gordon D.: *See—*
Norris, H. Coleman; and Kelly, Gordon D., 4,017,993.
Kelly, James P.; and Wandler, Donald, to McGraw-Edison Company. Lighting fixture with removable electrical component mounting arrangement. 4,019,044, Cl. 240-25.000.
Kennametal Inc.: *See—*
Heaton, James W.; Warren, Donald W.; and Albrecht, Albert B., 4,018,112.
Kennecott Copper Corporation: *See—*
Szabo, Lester J., 4,018,866.
Kent Instruments Limited: *See—*
Critten, Donald Louis; and Johnson, Peter Alan, 4,019,038.
Kent, Ronald I.; and Brown, Albert R., to Continental Can Company, Inc. Compartmented tray having improved divider means. 4,018,377, Cl. 229-27.000.
Keogh, Michael John: *See—*
Cotter, Robert James; Keogh, Michael John; and Heitz, William Donald, 4,018,721.
Keren, Eitan, to Sealed Air Corporation. Packaging apparatus. 4,018,034, Cl. 53-390.000.
Kerko, David J.; and Seward, Thomas P., III, to Corning Glass Works. Photochromic sheet glass compositions and articles. 4,018,965, Cl. 428-410.000.
Kermisch, Dorian: *See—*
Sheridon, Nicholas K.; Kermisch, Dorian; and Bergen, Richard F., 4,018,603.
Kerr, Ralph O.: *See—*
Barone, Bruno J.; and Kerr, Ralph O., 4,018,709.
Kersten, Gunter: *See—*
Fricke, Hans-Jurgen; Nonnenmacher, Gerhard; Robeller, Walter; and Kersten, Gunter, 4,018,137.
Ketterer, Stanley Joseph, to Singer Company, The. Feed regulator clamping device. 4,018,172, Cl. 112-215.000.
Keyes, Walter G.: *See—*
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,599.
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,630.
Keyser, William L.: *See—*
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., 4,018,900.
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., 4,018,901.
Keystone Consolidated Industries, Inc.: *See—*
Orr, John L.; and Sewell, Robert A., 4,018,487.

Khanna, Ram Tirth, to Du Pont de Nemours, E. I., and Company. High solids can coating compositions based on epoxy resin, crosslinking agent, flexibilizing polyol, co-reactive acid catalyst, and surface modifier. 4,018,848, Cl. 260-834.000.

Khazkhuta, Nikolai Yakovlevich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Khisametdinov, Akhmed Miftakhovich: *See—*
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich, 4,018,835.

Kiener, Volker: *See—*
Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, 4,018,967.

Kijima, Koichi: *See—*
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Kikumoto, Ryoji: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,018,913.
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,018,915.

Kilburn, Norman W.: *See—*
Johnson, Robert D.; Havener, John W.; Reyner, Franklin W., Jr.; Whitver, Loren K.; Kilburn, Norman W.; and Hoglan, Jack M., 4,018,358.

Kimberly-Clark Corporation: *See—*
Frick, Richard H., 4,018,432.

Kimmel, Earl J.; and Silk, Charles Earnest, deceased (by Silk, Wilma F., sole heir), to Olin Corporation. Nitrocellulose lacquer with surfactant. 4,018,637, Cl. 149-96.000.

Kimura, Katsuhiro; and Kaneko, Yoichi, to Hitachi, Ltd. Temperature compensated dielectric resonator device. 4,019,161, Cl. 333-82.00B.

Kimura, Kenji; and Kajiware, Takao, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust reaction apparatus for internal combustion engine having in-line cylinders. 4,018,047, Cl. 60-282.000.

Kimura, Kenji: *See—*
Matsuoka, Saburo; and Kimura, Kenji, 4,018,048.

Kimura, Morio: *See—*
Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, 4,018,739.

King Industries, Inc.: *See—*
Gallacher, Lawrence V., 4,018,865.

King-Wilkinson, Limited: *See—*
Erzen, Cevdet; Tillyer, Robert; and Williams, Norman Elliott, 4,018,057.

Kinoshita, Tadao: *See—*
Ohkawa, Masaaki; Tanaka, Yoshio; Takeda, Yoshiro; Kinoshita, Tadao; and Hirabayashi, Kazuyoshi, 4,018,756.

Kinsell, Robert C.; Noe, James C.; and Campbell, Carl D., to Garrett Corporation, The. Air conditioning system for aircraft. 4,018,060, Cl. 62-91.000.

Kish, Edward E.: *See—*
Shufflebarger, Earl D.; Kish, Edward E.; Cunningham, Frank M.; Boylan, John R.; and Murauskas, Donald J., 4,018,686.

Kita, Hideki: *See—*
Muramoto, Ikuo; and Kita, Hideki, 4,018,312.

Kitai, Kiyoshi; Saito, Takeo; and Seki, Youichi, to Seiko Koki Kabushiki Kaisha. Digital exposure time control circuit with self-timer. 4,019,189, Cl. 354-23.00D.

Klatt, Friedhard: *See—*
Jahnentz, Walter; Klatt, Friedhard; and Gaupp, Karl, 4,018,621.

Klauke, Guenter; and Wimmer, Anton, to Siemens Aktiengesellschaft. Process for producing a ring-shaped one-color or multi-color ribbon and a ribbon produced in accordance with this process. 4,018,955, Cl. 428-57.000.

Klautschek, Herwig, to Siemens Aktiengesellschaft. Commutation circuit for a converter. 4,019,116, Cl. 321-45.00C.

Klein, Arthur H., to GTE Sylvania Incorporated. Horizontal dynamic damper circuitry. 4,019,093, Cl. 315-370.000.

Klein, Gerald B.; and Lowe, Frank C., to Klein, Gerald B. Method of manufacture of a gated can lid with score at upper surface. 4,018,178, Cl. 113-121.00C.

Klein, Max, to Sealed Air Corporation. Production of heat-expandable styrene-polymer bit-pieces. 4,018,946, Cl. 427-222.000.

Kleinguenther, Robert A. Apparatus and process for treating wood and fibrous materials. 4,017,980, Cl. 34-13.400.

Kleinschmager, Herbert: *See—*
Fischer, Wilfried; Kleinschmager, Herbert; Haar, Wilheim; Weddigen, Gert; and Rohr, Franz-Josef, 4,018,969.

Klocker, Wilhelm: *See—*
Schneiders, Ernst; and Klocker, Wilhelm, 4,018,863.

Klomp, Edward D., to General Motors Corporation. Vortex chamber stratified charge engine. 4,018,193, Cl. 123-30.00C.

Klygis, Mindaugas Julius, to Illinois Tool Works Inc. Multipackaging devices. 4,018,331, Cl. 206-199.000.

KMS Fusion, Inc.: *See—*
Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, 4,019,151.

Knaack, Carl W., to Morris Associates, Inc. Golf flag assembly. 4,018,182, Cl. 116-173.000.

Knedlik, Omar. Mix blending pump. 4,018,545, Cl. 417-262.000.

Knight, John H., to Superior Oil Company, The. Thermal crushing of alkali compounds in the removal of sulfur dioxides from a flue gas. 4,018,868, Cl. 423-244.000.

Knox, Joseph Dale: *See—*
Gorog, Istvan; and Knox, Joseph Dale, 4,019,155.

Knudson, Jerome Leslie. Four wheel tractor. 4,018,296, Cl. 180-41.000.

Kobe Steel Ltd.: *See—*
Oishi, Minoru; Rokujo, Masaharu; Yokota, Hisaaki; Okuda, Naoki; Tomita, Makoto; and Endo, Toshihiko, 4,019,018.

Koch, Ulrich H.; Matousek, Stephen; and DiGennaro, Richard S., to Whitey Research Tool Co. Operating handle. 4,018,537, Cl. 403-240.000.

Kochte, Werner W. F. K.; and Bartholomew, Donald D., to Merit Plastics, Inc. Method of producing drag on an operating rod. 4,017,961, Cl. 29-450.000.

Koehler, Daniel Lynn: *See—*
Rastogi, Vijay; Budd, James Michael; and Koehler, Daniel Lynn, 4,018,482.

Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, to BASF Aktiengesellschaft. Manufacture of gamma-iron (III) oxide. 4,018,882, Cl. 423-634.000.

Kohler, Werner; and Steinemer, Norbert, to Siemens Aktiengesellschaft. Actuating mechanism for snap-actuating an electric switching apparatus. 4,019,008, Cl. 200-153.0SC.

Kojima, Kanji: *See—*
Kamisaka, Makoto; Kojima, Kanji; Negoro, Tatsuya; Uchikubo, Toshichika; Okamoto, Yusho; and Minato, Sadao, 4,018,026.

Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Watanabe, Tatsuo; and Saito, Hideki, 4,019,138.

Kolinger, Kenneth J.; Williams, Norman E.; Earley, Donald M.; and Golden, William R., to International Harvester Company. Automotive fan shroud for screening debris. 4,018,270, Cl. 165-119.000.

Komiya, Osamu, to Olympus Optical Co., Ltd. Apparatus for ligation of affected part in coeloma. 4,018,229, Cl. 128-326.000.

Komori, Tadaaki: *See—*
Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, 4,018,772.

Konishi, Masami; and Futamura, Kazumasa, to Toyota Jidoshu Kogyo Kabushiki Kaisha. Exhaust manifold reactor assembly. 4,018,049, Cl. 60-282.000.

Kono, Hidehiko, to Agency of Industrial Science & Technology. System for recognition of shape patterns. 4,019,173, Cl. 340-146.3AE.

Koori, Yoshizo: *See—*
Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, 4,018,710.

Korgemets, Dorothy. Adult undergarment. 4,018,226, Cl. 128-287.000.

Kori, Seiji: *See—*
Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, 4,018,812.

Kosuge, Momotoshi. Architectural block and the structure composed thereof. 4,018,018, Cl. 52-127.000.

Kothari, Girish H., to Pennsylvania Engineering Corporation. Suspension means for electric furnace transformer secondary buses. 4,018,975, Cl. 13-12.000.

Kovacs, Jenoe: *See—*
Fabian, Wolfgang; and Kovacs, Jenoe, 4,018,736.

Kovacs, Lloyd: *See—*
Safranski, Richard W.; and Kovacs, Lloyd, 4,018,029.

Kowalski, Walter: *See—*
Wolff, David Allen; and Kowalski, Walter, 4,019,090.

Kraft, Kurt; and Reese, Johannes, to Hoechst Aktiengesellschaft. Process for preparing triketoimidazolidines. 4,018,743, Cl. 260-77.5CH.

Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-5-acylimidazolidinones. 4,018,787, Cl. 260-306.80D.

Kronenberg, Stanley; and Lux, Robert A. Charge transport tactical dosimeter. 4,019,058, Cl. 250-376.000.

Kropp, Helmut H.: *See—*
Brown, Elwood B.; and Kropp, Helmut H., 4,018,322.

Krueger, Keith T., to I-T-E Imperial Corporation. Pneumatic timer. 4,019,001, Cl. 200-34.000.

Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletskaya, Vera Konstantinovna. Method of producing water-soluble amine-modified urea-formaldehyde resins modified with polyoxyalkylene ether. 4,018,740, Cl. 260-70.00A.

Krum, Jack K.: *See—*
Tollefson, Charles I.; Jackel, Simon S.; and Krum, Jack K., 4,018,898.

Krumlinde, Jockum, to Aktiebolaget Alga. Burner unit especially for toy steam engines. 4,018,000, Cl. 46-1.00R.

Kubose, Donald A.: *See—*
Hoffsommer, John C.; Kaplan, Lloyd A.; Kubose, Donald A.; and Glover, Donald J., 4,018,676.

Kubota, Eishi: *See—*
Nakamoto, Yuzuru; Kubota, Eishi; and Suzuki, Fukushi, 4,018,570.

Kuftarev, Vladimir Vasilievich: *See—*
Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletakaya, Vera Konstantinovna, 4,018,740.

Kugelfischer Georg Schafer & Co.: *See—*
Weigert, Hans; and Patel, Kirit, 4,018,041.

Kullman, Russell M. H.: *See—*
Reinhardt, Robert M.; Daigle, Donald J.; and Kullman, Russell M. H., 4,018,950.

Kunczynski, Jan K., to Lift Engineering & Mfg., Inc. Positive cable derailment sensing apparatus. 4,019,002, Cl. 200-61.180.

Kupfer, Rudolf, to Vol Roll A.G. Process for separating iron, zinc and lead from flue dust and/or flue sludge. 4,018,680, Cl. 210-50.000.

Kuragano, Morimasa, to Mitsui Toatsu Chemicals, Incorporated. Method for desorption of methyl bromide. 4,018,704, Cl. 252-411.00R.

Kuraray Co., Ltd.: *See—*
Fukushima, Osamu; Nagoshi, Kazuo; and Iwamoto, Toshiaki, 4,018,954.

Kurata, Noboru: *See—*
Kusunoki, Shigeru; Takano, Teruhisa; and Kurata, Noboru, 4,019,009.

Kurata, Sakae: *See—*
Yamamoto, Yuzuro; Kato, Hideo; Kurata, Sakae; and Nishide, Kazunori, 4,018,818.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.

Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, to Fujisawa Pharmaceutical Co., Ltd. Process for the purification of bicyclomycin. 4,018,772, Cl. 260-268.0BC.

Kurtz, Leonard D.; and Bidwell, Robert E., to Deknatel, Inc. Underwater drainage device with dual collection chambers. 4,018,224, Cl. 128-276.000.

Kustka, George John; and Mueller, Kurt Hugh, to Bell Telephone Laboratories, Incorporated. Correlative data demodulator. 4,019,149, Cl. 329-107.000.

Kusunoki, Shigeru; Takano, Teruhisa; and Kurata, Noboru, to Matsushita Electric Industrial Co., Ltd. Microwave heating apparatus. 4,019,009, Cl. 219-10.55F.

La Telemecanique Electrique: *See—*
Lameyre, Felix, 4,018,249.
Lascarrou, Alain, 4,018,498.

Lacefield, William B.; and Ho, Peter P. K., to Eli Lilly and Company. 5,6-Diaryl-1,2,4-triazines as topically-active anti-inflammatory agents. 4,018,923, Cl. 424-249.000.

Laevsky, Mikhail Avramovich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Lakomsky, Victor Iosifovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich, 4,018,973.

Lakshmanan, Pallavoor R., to Gulf Research & Development Company. Adhesive composition. 4,018,732, Cl. 260-27.00R.

Lalak, Joseph J.: *See—*
Singer, Barry M.; and Lalak, Joseph J., 4,018,638.

Lambert, James T. Live bait vending apparatus. 4,018,359, Cl. 221-14.000.

Lameyre, Felix, to La Telemecanique Electrique. Timing device for pneumatic control. 4,018,249, Cl. 137-624.110.

Lampietti, Bernard Pierre, to Torin Corporation. Spring winding machine with improved pitch mechanism. 4,018,071, Cl. 72-23.000.

Lampietti, Bernard Pierre: *See—*
Yagusic, George Joseph; and Lampietti, Bernard Pierre, 4,018,070.

Lance, Raymond E.; and James, Ronald N., to Construction Technology, Inc. Hydraulically powered impact device. 4,018,135, Cl. 91-321.000.

Landreau, Jean Florent Francois Marcel Robert, to Societe Anonyme Francaise du Ferodo. Rotary hydraulic machine. 4,018,139, Cl. 91-490.000.

Landrigan Corporation: *See—*
Landrigan, George E., 4,018,079.

Landrigan, George E., to Landrigan Corporation. Method and apparatus for testing hydraulic releases. 4,018,079, Cl. 73-4.00R.

Langstroth, Hall, to Watsco, Inc. Line tap valve. 4,018,246, Cl. 137-318.000.

Lanham, James W.; Holen, James T.; and Fadler, Norman L., to McDonnell Douglas Corporation. Process and apparatus for ascertaining the concentration of microorganism in a water specimen. 4,018,652, Cl. 195-103.50M.

Lapatukhin, Veniamin Semenovich: *See—*
Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich, 4,018,958.

Lapiere, Charles L.: *See—*
Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., 4,018,929.

La Point, Albert E., to La Point, James P., Jr. Apparatus for separating the constituents of lead-acid storage batteries. 4,018,567, Cl. 23-285.000.

La Point, James P., Jr.: *See—*
La Point, Albert E., 4,018,567.

LaPolla, Edmund M.; Murphy, Charles F.; and Sarkisian, Arthur, to International Telephone and Telegraph Corporation. Filtration of cellulosic solutions. 4,018,681, Cl. 210-66.000.

Lappi, Larry R.; and Erickson, Edward H., to Riker Laboratories, Inc. [1]Benzothieno[3,2-f]quinolinecarboxylic acids. 4,018,780, Cl. 260-287.00C.

Larsen, Darrell R., to Minneapolis Electric Steel Casting Company. Mounting for grinder liners. 4,018,393, Cl. 241-182.000.

Lascarrou, Alain, to La Telemecanique Electrique. Contact clamp. 4,018,498, Cl. 339-65.000.

Latimer, Robert M., to Caterpillar Tractor Co. Winch disconnect control arrangement. 4,018,424, Cl. 254-187.100.

Laussermair, Friedrich. Accumulator to store and release braking energy. 4,018,052, Cl. 60-414.000.

Lavaux, Jean-Paul: *See—*
Derible, Pierre Henri; and Lavaux, Jean-Paul, 4,018,922.

Lavrinenko, Vyacheslav Vasilievich: *See—*
Vishnevsky, Vladimir Sergeevich; Kavertsev, Vladimir Leonidovich; Kartashev, Igor Alexandrovich; Lavrinenko, Vyacheslav Vasilievich; Nekrasov, Mikhail Makarovich; and Prez, Alexei Alexeevich, 4,019,073.

Lawler, James H. Tank shell with integral walkway. 4,018,354, Cl. 220-20.000.

Lawrence Peska Associates, Inc.: *See—*
Benda, George, 4,018,332.
Williams, Ann, 4,017,970.

Lawrence, Robert J.; Devaney, John; and Tramontano, Dominick, to Grumman Aerospace Corporation. Timer controlled electromagnetic tripping apparatus for simultaneously closing plural switches mounted to panelboard. 4,019,166, Cl. 335-172.000.

Leach, Robert J., to George Kent Limited. Apparatus for providing a controlled concentration of a substance in a flow of liquid. 4,018,077, Cl. 73-1.00R.

Le Boeuf, Albert R.; and Grovesteen, William R., to Warner-Lambert Company. Crosslinked, hydrophilic rods of pyrrolidone-methacrylate graft copolymers. 4,018,853, Cl. 260-885.000.

Le Clercq, Pierre Alphonse Leon Marie Ghislain. Steel caissons. 4,018,055, Cl. 61-53.000.

Leco Corporation: *See—*
Sitek, George J.; and Berk, Charles W., 4,019,017.

Lee, Cheuk Man: *See—*
Zaugg, Harold Elmer; Lee, Cheuk Man; Michaels, Raymond John; and Plotnikoff, Nicholas Peter, 4,018,777.

Lee, Stuart M.; and Stafford, Jerrett D., to Ford Aerospace & Communications Corporation. Method for forming a bond between sapphire and glass. 4,018,374, Cl. 228-121.000.

Lee, Thomas E., to Ethyl Corporation. Process for the disposal of aluminum containing waste materials. 4,018,867, Cl. 423-115.000.

Lee, William H.: *See—*
Cox, Duncan B., Jr.; and Lee, William H., 4,019,153.

Lee, Yuan Ho. Blank turn-over device for high speed nut formers. 4,017,928, Cl. 10-76.00T.

Leendertz, Jack Albert, to National Research Development Corporation. Speckle pattern interferometer. 4,018,531, Cl. 356-109.000.

Leeper, Ralph S. Device for splicing rope. 4,018,039, Cl. 57-23.000.

Lefort, Marcel: *See—*
Marin, Gilbert; and Lefort, Marcel, 4,018,871.

Legros, Andre, to Bernard-Moteurs. Decompressing device. 4,018,203, Cl. 123-182.000.

Lehan, Frank W.: *See—*
Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., 4,019,201.

Leigh, John U., to Raymond Lee Organization, Inc., The, a part interest. Golf practice device. 4,018,436, Cl. 273-35.00B.

Leimgruber, Willy: *See—*
Cleeland, Roy, Jr.; Grunberg, Emanuel; Leimgruber, Willy; and Weigele, Manfred, 4,018,884.

Lejdegard, Sixten H., to Bulten-Kanthal Aktiebolag. Fastener package. 4,018,334, Cl. 206-346.000.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Chowning, John M., 4,018,121.

L'Electro-Refractaire: *See—*
Minssen, Bernard; and Parigot, Georges, 4,018,864.

Leliaert, Raymond M., to Wheelabrator-Frye, Inc. Vibratory finishing device. 4,018,009, Cl. 51-163.200.

Lemke, Galen D.: *See—*
Francel, Josef; and Lemke, Galen D., 4,018,717.

Lemkin, Jack L., to Midland-Ross Corporation. Box and lid therefor. 4,018,338, Cl. 206-505.000.

Lemon, Robert William, to Borg-Warner Corporation. Spin proof tandem axle drive mechanism. 4,018,317, Cl. 192-36.000.

Lengyel, Stephen Price; and Ishige, Toshiyuki, to Procter & Gamble Company, The. Laundry detergent compositions in emulsion/suspension. 4,018,720, Cl. 252-534.000.

Lenhard, Robert Herman: *See—*
Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,018,764.

Lennox, Forrest R., to Dow Chemical Company, The. Film slitting apparatus. 4,018,119, Cl. 83-425.300.

Lennox Industries, Inc.: *See—*
Mullen, James, 4,018,584.

Lenz, Herman N., to Teledyne Industries, Inc. Bevel gear shimming gage. 4,017,979, Cl. 33-174.00R.

Leo Pharmaceutical Products Ltd.: *See—*
Feit, Peter Werner; and Nielsen, Ole Bent Tvaermose, 4,018,794.
Leonard, Louis H.: *See—*
Patnode, Marvin M.; and Leonard, Louis H., 4,018,583.
Lerner, Harold S.: *See—*
DiBenedetto, Ernest A.; and Lerner, Harold S., 4,018,174.
Lesche, Wolfgang, to Siemens Aktiengesellschaft. Circuit arrangement for storing an electrical analog signal. 4,019,146, Cl. 328-151.000.
Leshem, Adam, to Combustion Engineering, Inc. Three-position actuator and apparatus incorporating same. 4,018,344, Cl. 214-1.0BB.
Leshem, Adam; Marugg, Martin Lewis; and Savor, Dennis Edward, to Combustion Engineering, Inc. Mounting arrangement for anchor fingers on a surface traversing apparatus. 4,018,346, Cl. 214-1.0BB.
Leshem, Adam: *See—*
Formanek, Frank Joseph; and Leshem, Adam, 4,018,345.
Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. N-(2-(pyridinyl)-4-pyrimidinyl)-aminomethylenemalonates and analogs. 4,018,770, Cl. 260-256.40N.
Lesher, Howard D.: *See—*
Friedman, Robert; and Lesher, Howard D., 4,019,016.
Lesparre, Jean: *See—*
Correia, Yves; and Lesparre, Jean, 4,018,880.
Levine, Aaron William; and Kaplan, Michael, to RCA Corporation. Electron beam recording comprising polymer of 1-methylvinyl methyl ketone. 4,018,937, Cl. 427-43.000.
Levine, Jeffrey C. Lethal weapon detection process. 4,019,053, Cl. 250-303.000.
Levine, Marshall S., to Geometric Data Corporation. Method of forming a packet of separated microscope slides. 4,018,643, Cl. 156-297.000.
Levine, Melvin: *See—*
Dzula, Gregory; Levine, Melvin; and Sperry, Elmer Ambrose, III, 4,018,089.
Lewis, David W.: *See—*
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Li, Tao P., to Monsanto Company. Oxidation/ammoxidation catalyst. 4,018,712, Cl. 252-456.000.
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Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, 4,018,373.
Rusch, Dieter; Glaser, Heinz; and Lubcke, Otto, 4,018,397.
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Liedke, Carl F., to O. F. Mossberg & Sons, Inc. Sear-disconnector for firearms. 4,017,996, Cl. 42-69.00B.
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Kunczynski, Jan K., 4,019,002.
Light, Glenn M.; and Richardi, Michael V. Trailer hitch alignment device. 4,017,977, Cl. 33-1.0LE.
Limper, Nicolaas Hendrik, to U.S. Philips Corporation. Television camera tube. 4,019,083, Cl. 313-372.000.
Lincoln, Neil R.; and Resnick, David R., to Control Data Corporation. Conditional latch circuit. 4,019,144, Cl. 328-92.000.
Linden, Wilhelm: *See—*
Gehm, Horst; Gratzke, Werner; and Linden, Wilhelm, 4,019,117.
Linder, Ernst; and Dettling, Hubert, to Robert Bosch G.m.b.H. Internal combustion engine. 4,018,196, Cl. 123-75.00B.
Lindsay, Harold W. Adjustable tool holder for boring bar. 4,018,542, Cl. 408-153.000.
Lindsey Manufacturing Company: *See—*
Bozeman, Hoyt W., Jr., 4,018,422.
Lindsey, William C.: *See—*
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Lindstrom, Edgar K., to J. I. Case Company. Anti-rollback mechanism for material handling implement. 4,018,352, Cl. 214-761.000.
Lindy, Lowell B., to Dow Chemical Company, The. Surfactant composition. 4,018,699, Cl. 252-353.000.
Linsinger, Ernst. Apparatus for trimming and edge-cutting a plate-like metallic workpiece. 4,018,134, Cl. 90-15.00R.
Lionetti, Fabian J.; and Hunt, Stephen M., to United States of America, Navy. Method for large volume freezing and thawing of packed erythrocytes. 4,018,911, Cl. 424-101.000.
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Lips, Hans-Peter, to BBC Brown Boveri & Company Limited. Energy transmission system with a common main for direct current. 4,019,115, Cl. 321-27.00R.
Lipschutz, Paul, to Neiman, S.A. Key-actuated barrel-type locks. 4,018,069, Cl. 70-395.000.
Lissant, Kenneth J.: *See—*
Mertz, Richard E.; and Lissant, Kenneth J., 4,018,426.
Littlewood, Peter Stuart; and Mercer, Alec Victor, to Sandoz Ltd. 5-Substituted-2-(2')-benzimidazoyl-furans. 4,018,789, Cl. 260-309.200.
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Giordano, Benjamin B., 4,018,156.
Llewelyn, David Myers, to International Nickel Company, Inc., The. High shrinkage powder body. 4,018,596, Cl. 75-.5AA.
Lloyd, L. Babcock. Rotary internal combustion engine. 4,018,191, Cl. 123-8.450.
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Loch, Ernst, to Zellweger, Ltd. Method and apparatus for determining the moisture content of different kinds of materials. 4,019,132, Cl. 324-65.00R.
Lockheed Aircraft Corporation: *See—*
Hsu, Nelson N., 4,018,084.
Loctite Corporation: *See—*
Baccei, Louis J., 4,018,851.
Lodge, Richard Worthington: *See—*
Wyness, Glen Reid; and Lodge, Richard Worthington, 4,018,806.
Loftdahl, Christer Edvin, to AB Samefa. Recording device for energy meters. 4,019,135, Cl. 324-113.000.
Logan, Francis D., to Camco, Incorporated. Self-centering steady rest for a machine tool. 4,018,115, Cl. 82-39.000.
Logemann Brothers Company: *See—*
Schmalz, Roman, 4,018,169.
Loggert, Bengt Georg: *See—*
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Lohmer, Karl; Seiz, Hermann; and Zietan, Karl, to AGFA-Gevaert, A.G. Color photographic multilayered material with layers of acid ashed gelatine. 4,018,609, Cl. 96-74.000.
Lohstroh, Jan; and Salters, Roelof Herman Willem, to U.S. Philips Corporation. Semiconductor floating gate storage device with lateral electrode system. 4,019,197, Cl. 357-23.000.
Lolachi, Houshang; and Goldsmith, Herbert, to Baxter Travenol Laboratories, Inc. Lubrication system for a centrifugal liquid processing system. 4,018,304, Cl. 184-7.00R.
Long, Ronald D.; Swain, Allan L.; and Lyon, Thomas C., to Consolidated Video Systems, Inc. Digital video synchronizer. 4,018,990, Cl. 358-149.000.
Lonza Ltd.: *See—*
Tenud, Leander, 4,018,821.
Lopez, Eugene Francis; Glover, Leon Conrad, Jr.; and Lyons, Bernard John, to Raychem Corporation. Hot melt adhesive composition comprising an acidic ethylene polymer and a polyamide. 4,018,733, Cl. 260-27.0EV.
LoPresti, Roy F., to Peskin, Samuel. Multipositionable portable and collapsible rectangular frame exercising apparatus with detachable support means. 4,018,437, Cl. 272-62.000.
Lorattio, Robert J. Cooled or heated enclosure. 4,018,585, Cl. 62-372.000.
Lorenz, Gunter: *See—*
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,018,809.
Lotto, Sergio; and Saggin, Francesco. Temporary, modular, self-erecting bridge. 4,017,932, Cl. 14-2.400.
Louisville Bedding Company: *See—*
Forrester, Harold C.; and Tatum, Harold E., 4,018,175.
Louzil, Friedrich, to U.S. Philips Corporation. Winding hub for a record carrier in the form of a tape. 4,018,398, Cl. 242-74.100.
Lowder, James T.; and Tausch, Edwin M., to Abrasive Technology, Inc. Diamond abrasive tool. 4,018,576, Cl. 51-309.00R.
Lowe, Frank C.: *See—*
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Lubcke, Otto: *See—*
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Lucas Electrical Company Limited, The: *See—*
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Lucas Industries Limited: *See—*
Joby, Michael John; and Maker, Paul Manwaring, 4,018,044.
Lucas, John M.; and Gracovetsky, Serge, to Domtar Limited. Measuring the surface roughness of a moving sheet material. 4,019,066, Cl. 250-562.000.
Lundquist, Merlin L. Lifting ring for plastic drums. 4,018,468, Cl. 294-67.0BA.
Lundqwist, Nils Rune; and Dahl, Gustav Lennart, to Aktiebolaget Atomenergi. Analysis of low ion contents. 4,018,563, Cl. 23-230.00R.
Lurey, Daniel Morris; and Drury, David Michael, to Motorola, Inc. PA protection circuit for a single sideband radio. 4,019,150, Cl. 330-2.000.
Lussow, Robert O.: *See—*
Berkenblit, Melvin; Lussow, Robert O.; Park, Kyu Chang; and Reisman, Arnold, 4,018,490.
Lutescu, Andrei: *See—*
Manoliu, Victor; Lutescu, Andrei; Ionescu, Gheorghe; Heretoiu, Silviu; Frangopol, Victor; and Petru, Lucuta, 4,018,082.
Lutz, Alfons; and Jardin, Hans, to Webasto-Werk W. Baier KG. Automobile sliding roof with transparent panel and shutter. 4,018,476, Cl. 296-137.00F.
Lux, Robert A.: *See—*
Kronenberg, Stanley; and Lux, Robert A., 4,019,058.
Lyman, John Bartholomew; and Stewart, Bruce Edmund, to Whirlpool Corporation. Vacuum cleaner hose end structure. 4,018,493, Cl. 339-15.000.
Lynch, Frank E.: *See—*
Baker, Nathaniel R.; and Lynch, Frank E., 4,018,553.
Lynch, Thomas J.: *See—*
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Lyon, Thomas C.: *See—*
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Lyons, Bernard John: *See—*
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Lyons, Merlyn E. Emergency building access apparatus. 4,018,306, Cl. 187-6.000.

Maag, Fritjof; and Unger, Friedrich, to Hoechst Aktiengesellschaft. Wrapped yarn. 4,018,042, Cl. 57-144.000.

Macchi, Giorgio: *See—*
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,872.
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MacDonald, Robert N., to Du Pont de Nemours, E. I., and Company. Polyamides containing 1,2,5-Oxadiazole-3,4-dicarbonyl groups. 4,018,748, Cl. 260-78.00R.

Machlett Laboratories, Incorporated, The: *See—*
Fitzsimmons, Thomas W.; Berluti, Vincent, Jr.; Wagner, Howard G.; and Shapiro, Jonathan S., 4,018,716.

MacMillan Bloedel Limited: *See—*
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Maeda, Ryozo; and Hirose, Katsumi, to Shionogi & Co., Ltd. Certain 2-iminothiazoline compounds. 4,018,785, Cl. 260-306.70T.

Maier, Dietmar: *See—*
Cramer, Charles Robert; vanLenthe, Gerrit Dirk; and Maier, Dietmar, 4,018,611.

Maione, Theodore Lincoln; Radcliffe, Frederick Enyeart; Sell, Darrell Dean; and Wolaver, Dan Holden, to Bell Telephone Laboratories, Incorporated. Regenerator for an optical transmission system. 4,019,048, Cl. 250-199.000.

Maitenaz, Bernard, to Essilor International (Compagnie Generale d'Optique). Method for producing a curved glass die having an aspherical polished concave face. 4,018,587, Cl. 65-17.000.

Maker, Paul Manwaring: *See—*
Joby, Michael John; and Maker, Paul Manwaring, 4,018,044.

Malkin, Vasily Berkovich: *See—*
Osintsev, Vladislav Grigorievich; Naumov, Jury Grigorievich; Esibyan, Eduard Migranovich; Danchenko, Mikhail Evgenievich; and Malkin, Vasily Berkovich, 4,018,375.

Mallick, George T., Jr.: *See—*
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Mallinckrodt, Inc.: *See—*
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Maloof, Robert Edward, to Victor Electric Wire & Cable Corporation. Multiple terminal connector plug. 4,018,501, Cl. 339-183.000.

Malz, Russell E., Jr.; Brown, Robert W.; and Greenfield, Harold, to Uniroyal, Inc. Production of fiber-forming polyamides by transamidation of N-alicyclic diamides with dicarboxylic acids. 4,018,747, Cl. 260-78.00R.

Malzahn, Ronald C.: *See—*
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Manderscheid, Phillip H.: *See—*
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Manley, Robert E.; and McCoy, John D., to Gulf Research & Development Company. Corrosion detecting and monitoring apparatus. 4,019,133, Cl. 324-65.0CR.

Mann, Harold J., Jr. Solar heating structure. 4,018,213, Cl. 126-271.000.

Manoliu, Victor; Lutescu, Andrei; Ionescu, Gheorghe; Heretoiu, Silviu; Frangopol, Victor; and Petru, Lucuta, to Institutul Pentru Creatie Stintifica si Tehnica-Increst. Device for nondestructive ultrasonic testing of cylindrical parts. 4,018,082, Cl. 73-67.50R.

Manson, Morris, to Corax Corporation. Slide brackets. 4,018,488, Cl. 312-348.000.

Marathon Oil Company: *See—*
Andon, Nicholaki A.; and Fleece, Robert I., 4,018,671.

Marcade, Roque Denis; and Gurubatham, Vincent Paulraj, to Whirlpool Corporation. Refuse compactor with automatic drawer opener. 4,018,147, Cl. 100-45.000.

Marcal Paper Mills, Inc.: *See—*
Smaw, Jesse B., 4,018,031.

Marchenko, Alexei Alexeevich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Marek, Miroslav; Toman, Ludek; and Pecka, Jan, to Ceskoslovenska akademie ved. Method for radiation polymerization and copolymerization of isobutylene by a cationic mechanism. 4,018,659, Cl. 204-159.240.

Margolis, Hyman J. Sanitary hand covering with shaping fasteners. 4,017,907, Cl. 2-158.000.

Marietta, Robert L.: *See—*
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Marin, Gilbert; and Lefort, Marcel, to Rhone-Poulenc Industries. Dismutation of trichlorosilane. 4,018,871, Cl. 423-342.000.

Marker, Hannes: *See—*
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Marklein, Heinz, to Fa. Schmalbach-Lubeca GmbH. Vacuum closure for containers. 4,018,353, Cl. 215-253.000.

Markus, Frank, to Steel Company of Canada, Limited, The. Method for liquid mixing. 4,018,598, Cl. 75-61.000.

Marlow, Darrell W., to Olin Corporation. Inflating device for use with vehicle safety systems. 4,018,457, Cl. 280-735.000.

Martelet, Ronald G., to Sears, Roebuck and Co. Safety lighting system. 4,019,171, Cl. 340-134.000.

Martellock, Arthur C., to Xerox Corporation. Coating method. 4,018,953, Cl. 427-430.00R.

Martin, Francis W., to Corning Glass Works. Diode encapsulation glass. 4,018,613, Cl. 106-53.000.

Martin, Walter L., Jr.: *See—*
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Martinelli, Ramon Ubaldo: *See—*
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Marugg, Martin Lewis: *See—*
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Marulic, Walter J.: *See—*
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Marulli, Alfred N., to National Plastics & Plating Supply Co., Inc. Electroplating barrel sidewall construction. 4,018,427, Cl. 259-81.00R.

Maruya, Takashi: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Niroyuki; and Maruya, Takashi, 4,018,616.

Marzonie, James M.; and Jautakis, Karl, to Whirlpool Corporation. Electrically heated dryer. 4,019,023, Cl. 219-400.000.

Masi, Paolo: *See—*
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Maskery, Arthur, to Westinghouse Brake and Signal Co. Ltd. Magnetic amplifier arrangements. 4,019,123, Cl. 323-85.000.

Mason, William T., Jr., to General Motors Corporation. Tractor-trailer aerodynamic drag reducer. 4,018,472, Cl. 296-1.00S.

Masse, Norman G.: *See—*
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Massey, David H. Ring buoy. 4,017,927, Cl. 9-340.000.

Masson Scott Thrissell Engineering Limited: *See—*
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Massucco, Arthur A.: *See—*
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Mateja, Eugene V.: *See—*
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Matousek, Stephen: *See—*
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Matsumoto, Jyusei; Itoh, Minoru; Ishikawa, Chuzi; and Hashimoto, Yoshio, to Ricoh Co., Ltd. Printing apparatus for cash register. 4,018,154, Cl. 101-93.020.

Matsuno, Kazuo: *See—*
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Matsuoka, Saburo; and Kimura, Kenji, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust reaction chamber assembly for internal combustion engine. 4,018,048, Cl. 60-282.000.

Matsushima, Haruo: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Mifune, Hideo; Tani, Kenroku; and Niikawa, Tomohiko, 4,019,072.
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Matthews, Dean A.: *See—*
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Mattox, William J., to Exxon Research and Engineering Company. High surface area alumina and method for the preparation thereof. 4,018,881, Cl. 423-631.000.

Maurer, Gustav: *See—*
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Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
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Mayer, Ivan, to Exxon Research and Engineering Company. Method for continuously controlling the water content of sulfuric acid alkylation catalyst. 4,018,846, Cl. 260-683.590.

McAleer, William J.; and Hilleman, Maurice R., to Merck & Co., Inc. Syringe containing frozen vaccine. 4,018,222, Cl. 128-216.000.

McArthur, Billy Walton, to Sperry-Sun Well Surveying Company. Borehole pressure measurement apparatus having a high pressure float valve. 4,018,088, Cl. 73-151.000.

McAvoy, Thomas R.: *See—*
Davis, John E.; and McAvoy, Thomas R., 4,018,575.

McClelland, Harold Grant, to Northern Electric Company Limited. Noise suppression circuit for switched telephone lines. 4,018,995, Cl. 179-79.000.

McCoy, John D.: *See*—
Manley, Robert E.; and McCoy, John D., 4,019,133.
McCoy, John H.; and Sullivan, Paul A., to Hughes Aircraft Company. Alignment system and method with micromovement stage. 4,019,109, Cl. 318-640.000.
McCready, Raymond George; and Eggers, Philip Eugene, to Sundstrand Corporation. Heat pipe cooling system for electronic devices. 4,019,098, Cl. 361-385.000.
McDermott, Michael John; Allen, John Graham; Jones, Keith; and Wright, Peter Gordon, to Imperial Chemical Industries Limited. Electrochromic device and medium therefor. 4,018,508, Cl. 350-160.00R.
McDevitt, Edward J., to United States of America, Navy. X-Y to range-bearing converter. 4,019,032, Cl. 235-150.500.
McDonald, Charles H. Method for emulsifying asphalt-rubber paving material and a stable thixotropic emulsion of said material. 4,018,730, Cl. 260-17.40R.
McDonald, Wilson C.: *See*—
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McHatton, Austin D.: *See*—
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McIntosh, Colin Leslie, to Du Pont de Nemours, E. I., and Company. Carboxyphosphonates. 4,018,854, Cl. 260-941.000.
McKay, Larry L.: *See*—
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McKee, William H.; and Schubert, Anthony E., to TRW Inc. Terminal connectors and method of making the same. 4,018,177, Cl. 113-119.000.
McQuinn, Ted M.; and Anderson, Richard B., to General Motors Corporation. Engine and transmission power train. 4,018,316, Cl. 192-3.300.
Mead, Theodore C.; and Ashton, William B., to Texaco Inc. Transformer oils. 4,018,693, Cl. 252-64.000.
Meador, Richard A., to Texaco Inc. Dipmeter means utilizing generated eddy currents and lines of flux in an earth formation. 4,019,126, Cl. 324-5.000.
Mefina S.A.: *See*—
Jimenez, Antonio, 4,018,173.
Megee, Robert Luther. Pedal operator for piano and the like. 4,018,128, Cl. 84-231.000.
Mehalso, Robert Michael, to RCA Corporation. Method of making a metallized video disc having an insulating layer thereon. 4,018,945, Cl. 427-41.000.
Meinke, Russell F.: *See*—
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Meiser, Werner: *See*—
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Melnik, Gary Alexandrovich: *See*—
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich, 4,018,973.
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Mennen, Frederick C., to U.S. Packaging Corporation. Instruments for the detection of *Neisseria gonorrhoeae* without culture. 4,018,653, Cl. 195-127.000.
Mentschel, Hellmuth, to Siemens Aktiengesellschaft. Reactor for the catalytic conversion of hydrocarbons with a gas containing oxygen to form a fuel gas. 4,018,573, Cl. 48-107.000.
Menuiserie du Val de Rhins R. Boucher S.A.: *See*—
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Merck & Co., Inc.: *See*—
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McAleer, William J.; and Hilleman, Maurice R., 4,018,222.
Meresz, Otto; and Mozsgai, Cecilia. Long chain internally unsaturated alkenes. 4,018,844, Cl. 260-677.00R.
Merino, Elias Munoz, to Fabrica Espanola Magnetos, S.A. Semi-conductor device capable of supporting high amperages of inverse current. 4,019,195, Cl. 357-13.000.
Merit Plastics, Inc.: *See*—
Kochte, Werner W. F. K.; and Bartholomew, Donald D., 4,017,961.
Merlin Industries, Inc.: *See*—
Alfin, Norman J.; and Scott, Robert, 4,018,658.
Merrill, Richard E.; and Massucco, Arthur A., to Arthur D. Little, Inc. Method of rendering surfaces nonfogging. 4,018,939, Cl. 427-54.000.
Mertz, Richard E.; and Lissant, Kenneth J., to Petrolite Corporation. System for producing emulsions. 4,018,426, Cl. 259-7.000.
Mery, Jean-Claude, to Societe Anonyme D.B.A. Disc brake and locking means therefor. 4,018,309, Cl. 188-72.400.
Messerly, James William, to B. F. Goodrich Company, The. Flexible coating compositions. 4,018,847, Cl. 260-831.000.
Messrs. adidas Sportschuhfabriken Adi Dassler K.G.: *See*—
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Metal Box Company Limited, The: *See*—
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Cramer, Charles Robert; vanLenthe, Gerrit Dirk; and Maier, Dietmar, 4,018,611.
Metlesics, Werner; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Process for the preparation of certain hydroperoxy derivatives. 4,018,765, Cl. 260-239.0BC.
Metzger, Carl: *See*—
Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, 4,018,924.
Meuleman, Johannes, to U.S. Philips Corporation. Apparatus for treating a plurality of semiconductor slices to a reacting gas current. 4,018,183, Cl. 118-49.000.
Meyer, Leonard S. Archery bow with arcuate limb attachments. 4,018,205, Cl. 124-24.00R.
Micco, Alexander J.: *See*—
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Michaels, Raymond John: *See*—
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Michaux, Jean-Pierre; and Arnaud, Guy, to Compagnie Francaise de Raffinage. Process for the obtaining of isobutylene of high purity. 4,018,843, Cl. 260-677.00A.
Michel, Henri; and Gantois, Michel. High intensity ionic bombardment reactor for thermochemical treatment processes. 4,019,064, Cl. 250-543.000.
Michel, Stephen: *See*—
Contois, Lawrence E.; Kaukeinen, Joseph Y.; Michel, Stephen; and Plutchak, Thomas M., 4,018,606.
Michener Associates, Inc.: *See*—
Barichello, Gary Douglas, 4,018,386.
Michetti, Anthony B., to I-T-E Imperial Corporation. Multi-pole circuit breaker with baffle shield venting. 4,019,005, Cl. 200-144.00R.
Microfibres, Inc.: *See*—
Casey, James P., 4,018,956.
Midland-Ross Corporation: *See*—
Bulanchuk, William J., 4,018,497.
Gute, Robert M., 4,019,004.
Lemkin, Jack L., 4,018,338.
Mifune, Hideo; Tani, Kenroku; and Niikawa, Tomohiko, to Matsushita Electric Industrial Co., Ltd. Piezoelectric pressure sensor. 4,019,072, Cl. 310-8.100.
Mihalic, William T., to Eaton Corporation. Positioning device for adjustable steering columns. 4,018,101, Cl. 74-493.000.
Mijnheer, Andries: *See*—
Prast, Gijsbert; Mijnheer, Andries; and Mulder, Jan, 4,018,552.
Mika, Anton Leroy: *See*—
Raudys, Vytas Andrew; and Mika, Anton Leroy, 4,017,941.
Mikulicz, Michael Z.; Boney, William G.; and Vora, Bipin V., to UOP Inc. Process for alkylation of aromatics. 4,018,841, Cl. 260-671.00R.
Miller, Art J.: *See*—
Clark, Gary E.; and Miller, Art J., 4,018,086.
Miller, Charles. Room planning kit. 4,017,986, Cl. 35-16.000.
Miller, Louis Donald; and Popp, Hans, to RCA Corporation. Method for extending cathode life in vidicon tubes. 4,018,489, Cl. 316-5.000.
Miller, Robert C.; Mallick, George T., Jr.; and Emtage, Peter R., to Westinghouse Electric Corporation. Circuit breaker with solid state passive overcurrent sensing device. 4,019,097, Cl. 361-93.000.
Miller, Robert C.: *See*—
Ryan, Frederick M.; and Miller, Robert C., 4,018,635.
Miller, Stewart Edward, to Bell Telephone Laboratories, Incorporated. Directional optical waveguide couplers. 4,019,051, Cl. 250-227.000.
Mills, David, to Rolls-Royce (1971) Limited. Refractory material containing fused silica and crystalline phase silica. 4,018,615, Cl. 106-69.000.
Minaki, Toshiaki: *See*—
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.
Minato, Sadao: *See*—
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Minneapolis Electric Steel Casting Company: *See*—
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Minnesota Mining and Manufacturing Company: *See*—
Davis, John E.; and McAvoy, Thomas R., 4,018,575.
Olsen, David B., 4,018,605.
Peterson, Robert L., 4,018,745.
Siemens, Dan H., Jr.; and Wheelwright, Earl J., 4,018,561.
Skoog, Ivan H., 4,018,810.
Minssen, Bernard; and Parigot, Georges, to L'Electro-Refractaire. Method for making fused refractory products. 4,018,864, Cl. 264-299.000.

Mirecki, Walter. Hot cap. 4,018,003, Cl. 47-26.000.
Mischenko, Nicholas, to Bell & Howell Company. Mixed slide separator. 4,018,521, Cl. 353-104.000.
Mitchell, Edward; and Cobb, John M., to Texaco Inc. Engine piston with insulated combustion chamber. 4,018,194, Cl. 123-32.00C.
Mitchell, Thomas J.; and Pengue, Leonard M., to Pitney-Bowes, Inc. Pneumatic feed device. 4,018,434, Cl. 271-96.000.
Mitsubishi Chemical Industries Ltd.: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,018,913.
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Onoda, Takeru; and Otake, Masayuki, 4,018,816.
Mitsubishi Denki Kabushiki Kaisha: *See*—
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Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Hiramatsu, Takashi; Oe, Akihiko; Fukuda, Atsushi; Fuse, Masaki; and Mori, Tatsujiro, 4,019,036.
Mitsui Toatsu Chemicals, Incorporated: *See*—
Kuragano, Morimasa, 4,018,704.
Miyagawa, Fumihiro, to Ricoh Co., Ltd. Photographic camera of the retractable lens tube type with a movable lens cover. 4,019,192, Cl. 354-187.000.
Miyake, Hajimu: *See*—
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Miyake, Toshio, to Sumitomo Chemical Company Limited; and Hayashibara Biochemical Laboratories, Incorporated. Shaped matters of tobaccos and process for producing the same. 4,018,233, Cl. 131-17.0AC.
Miyata, Katsuhiko, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photometric device for use in a single lens reflex camera. 4,019,191, Cl. 354-155.000.
Miyazaki, Teruko U.: *See*—
Gupton, John T., III; Jelenevsky, Alex M.; Miyazaki, Teruko U.; and Petree, Harris E., 4,018,771.
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Mobil Oil Corporation: *See*—
Chang, Harry L., 4,018,281.
Daviduk, Nicholas; Lewis, David W.; and Siuta, Michael T., 4,018,280.
Moe, James A. Selection console and locking mechanism for vending machine. 4,018,100, Cl. 74-483.0PB.
Moelders, Johann, to Berger Maschinenfabriken G.m.b.H. & Co. Spinning jet blasting plant for cleaning shaped workpieces. 4,018,006, Cl. 51-9.00R.
Mohajery, Mahmood; and Rawlins, Charles B., to Aluminum Company of America. Transmission line system having improved stability characteristics from wake-induced subspan oscillations. 4,018,980, Cl. 174-42.000.
Mohawk Data Sciences Corporation: *See*—
Cargill, N. Allen, 4,018,155.
Robinson, Max S.; and Studebaker, Thomas J., 4,018,999.
Molins Limited: *See*—
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Mollard, Paul, to Produits Chimiques Ugine Kuhlmann. Process for the production of sodium percarbonate by atomization. 4,018,874, Cl. 423-415.00P.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-one pharmaceutical compositions and methods for effecting diuresis, saluresis and for treating hypertension. 4,018,890, Cl. 424-273.000.
Molloy, Bryan B.; and Schmiegel, Klaus K., to Eli Lilly and Company. Aryloxyphenylpropylamines in treating depression. 4,018,895, Cl. 424-330.000.
Molloy, Bryan B., to Eli Lilly and Company. Antiarrhythmic agents. 4,018,897, Cl. 424-330.000.
Moltgen, Gottfried, to Siemens Aktiengesellschaft. Apparatus for compensating reactive power in a three-phase network. 4,019,124, Cl. 323-102.000.
Mominee, David E.; and Vance, Gilbert W., to Reed Irrigation Systems. Submain connector. 4,018,459, Cl. 285-5.000.
Monarch Marking Systems, Inc.: *See*—
Vanderpool, James L.; and Hoertt, Dennis J., 4,019,174.
Moncur, N. Kent: *See*—
Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, 4,019,151.
Monna, Takashi, to Kabushiki Kaisha Suwa Seikosha. Electronic wristwatch incorporating calculator. 4,019,037, Cl. 235-156.000.
Monpetit, Louis, to Societe Anonyme D.B.A. Miniature solenoid valve. 4,018,419, Cl. 251-65.000.
Monsanto Company: *See*—
Bartram, Ronald D.; and Runkle, Charles J., 4,018,073.
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Mooradian, Victor G.: *See*—
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Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,630.
Moore, David M., to Armstrong Store Fixture Corporation. Bracket and clip for mounting a cross-bar to a bracket. 4,017,943, Cl. 24-84.00R.
Morehouse, Alpha L.: *See*—
Garbutt, John T.; Malzahn, Ronald C.; and Morehouse, Alpha L., 4,018,936.
Morell, Antoinette; and Nicolas, Jean, to Thomson-CSF. Method of manufacturing a magnetic head having a relatively large air-gap and a good resistance to mechanical wear. 4,017,966, Cl. 29-603.000.
Morgan, Arthur Picton, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Phase modulation apparatus. 4,019,185, Cl. 343-17.20R.
Morgan, Charles R., to W. R. Grace & Co. Process for forming solder resistant photoresist coatings. 4,018,940, Cl. 427-54.000.
Morgan, John R.: *See*—
Donakowski, William A.; and Morgan, John R., 4,018,949.
Mori, Kentaro: *See*—
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Morine, Richard L.; and Hokes, James J., to Fedco Inc. Manifold dispensing apparatus having releasable subassembly. 4,018,367, Cl. 222-485.000.
Morozov, Sergei Nikolaevich: *See*—
Budker, Gersh Itskovich; Morozov, Sergei Nikolaevich; Nezhevenko, Oleg Alexandrovich; Ostreiko, Gennady Nikolaevich; and Shekhtman, Isai Abramovich, 4,019,088.
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Morris, Bennie A. Apparatus for automatically grading leaf tobacco. 4,018,674, Cl. 209-73.000.
Morris, Roy H.; Turner, George L.; and Hixon, Walter L., to American Stamping Company. Hose coupling. 4,018,460, Cl. 285-39.000.
Morrison, Neolan V. Cinch winch for saddling a horse. 4,018,035, Cl. 54-23.000.
Morton-Norwich Products, Inc.: *See*—
Schwan, Thomas J., 4,018,823.
Moser, Peter; and Nicopoulos, Alex, to Ciba-Geigy Corporation. Process for the manufacture of basic oxazine dyes. 4,018,763, Cl. 260-245.000.
Moser, William R., to Exxon Research and Engineering Company. Hydrodesulfurization catalyst and process utilizing the same. 4,018,672, Cl. 208-216.000.
Motoren- und Turbinen-Union Munchen GmbH: *See*—
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Motorola, Inc.: *See*—
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Gartner, Todd Henry, 4,018,202.
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Numan, Daniel Orange; and Williamson, Richard Dean, 4,019,141.
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Mueller, Kurt Hugh: *See*—
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Muko, Sakae. Fish-feeder. 4,017,999, Cl. 43-44.990.
Mulder, Jan: *See*—
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Mullen, James, to Lennox Industries, Inc. Air conditioning system having latent and sensible cooling capability. 4,018,584, Cl. 62-175.000.
Muller, Alfred; and Fink, Arno, to Siemens Aktiengesellschaft. Method for the manufacture of a superconductor with a layer of the A-15 phase of the system Nb-Al or Nb-Al-Ge. 4,018,942, Cl. 427-62.000.

Muller, Hans. Process for recovering useful substances from culture media. 4,018,593, Cl. 71-76.000.
Muller, Hans. Arrangement for aerating of liquids. 4,018,859, Cl. 261-87.000.
Muller, Rudolf; and Stolberg, Hermann Josef, to Hermann Rappold & Co. GmbH. Slide valve for closing a large pressurized gas conveying pipe. 4,018,420, Cl. 251-172.000.
Muller, Werner Heinrich; and Fernholz, Hans, to Hoechst Aktiengesellschaft. Preparing resorcinols from δ-ketocarboxylic acids or from their lactones. 4,018,833, Cl. 260-621.00R.
Muller, Wolfgang Dieter: *See*—
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Mullin, Alexander G.: *See*—
Barr, Anthony J.; and Mullin, Alexander G., 4,017,976.
Mundel, Gunter; and Grampp, Friedrich, to Ed. Zublin Aktiengesellschaft. Machine for making reinforcing baskets for steel concrete posts, masts, pipes and the like. 4,018,251, Cl. 140-112.000.
Muramoto, Ikuo; and Kita, Hideki, to Toyo Kogyo Co., Ltd. Duo-servo parking brake. 4,018,312, Cl. 188-333.000.
Muraoka, Keiji, to Acecook Co., Ltd. Container for an instant food. 4,018,904, Cl. 426-115.000.
Murauskas, Donald J.: *See*—
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Murnane, Edward L. Rescue garment. 4,017,908, Cl. 2-84.000.
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Murphy, John R., to Glenn, Coy F., a part interest. Compressed air-operated motor employing dual lobe cams. 4,018,050, Cl. 60-370.000.
Murray, Douglas J., to Dimensional Industries, Inc. Wall frames with interlocking clips. 4,017,989, Cl. 40-152.000.
MWA Company: *See*—
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Myers, William N.: *See*—
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Naber, Joseph S., to Applied Motors, Inc. DC to AC voltage converter with automatic start-stop control of motor-generator set. 4,019,119, Cl. 322-8.000.
Nagasawa, Koichi; and Kijima, Koichi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for treatment of semiconductor wafer. 4,018,184, Cl. 118-49.100.
Nagin, Tony, Jr.; and Nagin, Tony, Sr. Decelerating safety bumper for vehicles and the like. 4,018,299, Cl. 180-91.000.
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Nagoshi, Kazuo: *See*—
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Nakagawa, Hirohide: *See*—
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Nakagawa, Yasuo; Noma, Takashi; and Mera, Hiroshi, to Teijin Limited. Anisotropic dopes of aromatic polyamides. 4,018,735, Cl. 260-29.10R.
Nakajima, Taiitu: *See*—
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.
Nakamoto, Yuzuru; Kubota, Eishi; and Suzuki, Fukushi, to Bridgestone Tire Company Limited. Composite of a metallic material and vulcanized rubber. 4,018,570, Cl. 152-359.000.
Nakanishi, Sadao; and Tokura, Nobufumi, to Shinko Electric Co., Ltd. Laser beam label reader head. 4,019,026, Cl. 235-61.11E.
Nakao, Hisaji; Tokura, Yasufumi; Matsuno, Kazuo; and Yomogida, Toshihiko, to Toyoda Koki Kabushiki Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Program changeable sequence controller. 4,019,175, Cl. 340-172.500.
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Nameche, Alfred E. Clamp type ladder wall engaging bracket. 4,018,301, Cl. 182-206.000.
Namiki, Ryoichi, to Ricoh Co., Ltd. Roller for fixing electrophotographic toner images and method of producing the same. 4,019,024, Cl. 219-469.000.
Nash, John E.: *See*—
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Neal, John A., to Georgia-Pacific Corporation. Aryl sulfonate-aldehyde composition and process for its preparation. 4,018,691, Cl. 252-62.540.
Neal, Vay F. Anti-skid device for vehicle wheel. 4,018,258, Cl. 152-208.000.
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Nelson, John E., to HMW Industries, Inc. Magnetic tooth straightener. 4,017,973, Cl. 32-14.00A.
Nelson, Terence John, to Bell Telephone Laboratories, Incorporated. Magnetic bubble detector. 4,019,177, Cl. 340-174.0TF.
Nemoto, Kiyomitsu; Naito, Kesahiro; Urata, Megumu; and Sagawa, Norihiko, to Hitachi, Ltd. Method for disassembling and repairing a sodium-handling apparatus. 4,017,952, Cl. 29-157.30R.
Neumann, Ute; Roller, Hermann; Hartmann, Job-Werner; Hack, Joachim; Motz, Herbert; and Ostertag, Werner, to BASF Aktiengesellschaft. Coated magnetic recording media. 4,018,968, Cl. 428-539.000.
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Niehaus, Edward J.; and Hosack, James R., to Rockwell International Corporation. Adjustable dado head. 4,018,256, Cl. 144-238.000.
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Noll, Barton B., to R. C. Sports, Inc. Laminar roller rink surface having high solids content primer layer. 4,018,961, Cl. 428-213.000.
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Norlin, Stig Ivar, to Saab-Scania Aktiebolag. Vehicle bumper assembly. 4,018,466, Cl. 293-71.00R.
Norris, H. Coleman; and Kelly, Gordon D., to Columbian Art Works, Inc. Rotary file. 4,017,993, Cl. 40-68.000.
North American Philips Corporation: *See*—
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O'Brien, Patrick H.; and Zabritski, William J., to General Motors Corporation. Multispeed shift linkage control. 4,018,099, Cl. 74-473.00R.
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Ochsner, Paul Albert; and Schenk, Hanspeter, to Givaudan Corporation. 2-Ethyl-3,6,6-trimethyl-1-crotonyl-2-cyclohexene-type compounds and perfume compositions. 4,018,718, Cl. 252-522.000.
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Olsson, Kjell Olow Ingemar; and Loggert, Bengt Georg, to U.S. Philips Corporation. Transponder system. 4,019,181, Cl. 343-6.5SS.
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O'Neill, Paul L.; and Hooper, Juan L., to United States of America, Navy. Soluble binder for plastic bonded explosives and propellants. 4,018,636, Cl. 149-19.400.
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Ortega, Jose I. Interaction multi-station alarm system. 4,019,139, Cl. 325-16.000.
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Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, to Hitachi Maxell, Ltd. Reduction catalysts and processes for reduction of nitrogen oxides. 4,018,710, Cl. 252-439.000.
Osintsev, Vladislav Grigorievich; Naumov, Jury Grigorievich; Esibyan, Eduard Migranovich; Danchenko, Mikhail Evgenievich; and Malkin, Vasily Berkovich. Method of manufacturing a nonconsumable copper-zirconium electrode. 4,018,375, Cl. 228-131.000.
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Ozretich, Thomas M., to Dow Chemical Company, The. Substituted oxirane compounds. 4,018,801, Cl. 260-348.00R.
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Palmer, John P., to General Dynamics Corporation. Integrated array of optical fibers and thin film optical detectors, and method for fabricating the same. 4,017,962, Cl. 29-572.000.
Palthe, John W. Brush cleaning device. 4,018,240, Cl. 134-196.000.
Paoli, Stephen A. High production mechanical separator machine. 4,018,389, Cl. 241-67.000.
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Parks, Robert E.; and Marietta, Robert L., to Antek Instruments, Inc. Chemiluminescent nitrogen detection apparatus and method. 4,018,562, Cl. 23-230.0PC.
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Parsons, Roger R., to Raven Industries, Inc. Redundant blower drive for pressurized hot air airship. 4,018,406, Cl. 244-98.000.
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Paton, Anthony David; and Rowland, Roger John, to Imperial Chemical Industries Limited. Process for production of drop streams. 4,018,383, Cl. 239-4.000.
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich. Furnace construction for plasma arc remelting of metal. 4,018,973, Cl. 13-9.0ES.
Patterson, Jan J. Cutting method and machine employing heated reciprocating wire. 4,018,117, Cl. 83-16.000.
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Pearson, Raymond H. Toilet ventilator including motion-responsive electrical transducer. 4,017,916, Cl. 4-213.000.
Peck, Theodore H., to Bausch & Lomb Incorporated. Objective centering nosepiece. 4,018,505, Cl. 350-39.000.
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Pedlow, J. Watson. Arc and fireproofing tape. 4,018,962, Cl. 428-245.000.
Pedlow, J. Watson. Electrical arc and fire protective sheath, boot or the like. 4,018,983, Cl. 174-135.000.
Pei, Yu K., to Owens-Illinois, Inc. Liquid operated solar energy collector. 4,018,215, Cl. 126-271.000.
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Perez, Louis A., Jr.; and Tatarenko, Galina. Pedicure sandal. 4,017,987, Cl. 36-11.500.
Perhed, Per-Gunnar Arthur, to AB Volvo. Remote-controlled, motor-propelled transport car for the transport of motors during assembly and testing, and a test station for use together with the transport car. 4,018,343, Cl. 214-1.00Q.
Perkins, Lee E., to Kajan Specialty Company, Inc. Apparatus and method for gravel packing a well. 4,018,284, Cl. 166-278.000.
Person, Herman R.; and Gilg, Lawrence E., to Dale Electronics, Inc. Electrical indicia display device and method for making same. 4,019,086, Cl. 313-518.000.
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Peruchon, Edouard; and Rabischong, Pierre, to Societe Nationale Elf Aquitaine (Production). Device for taking an impression and visualizing said impression. 4,017,978, Cl. 33-174.00L.

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Pollitzer, Ernest L.; and Hayes, John C., to Universal Oil Products Company. Hydrocarbon conversion with an acidic multimetallic sulfur-free catalytic composite. 4,018,668, Cl. 208-139.000.
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Poma, Luis, to Interpile USA, Inc. Apparatus for forming cast-in-place caseless concrete piles and the like. 4,018,056, Cl. 61-53.640.
Popov, Nikolai Ivanovich: *See—*
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich, 4,018,835.
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Pozzato, Alberto: *See—*
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Pozzato, Mariano: *See—*
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Pozzato, Tarcisio; Pozzato, Mariano; and Pozzato, Alberto. Plate mill for pebbles, gravel or like materials. 4,018,395, Cl. 241-252.000.
Pozzetti, Mario; and Rossi, Roberto, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C. Method and relative apparatus for controlling and regulating the working cycles of a machine tool. 4,018,010, Cl. 51-165.710.
Pozzetti, Mario, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C. Monitoring apparatus for checking the regularity of the operation of logic systems. 4,019,029, Cl. 235-92.0PD.
PPG Industries, Inc.: *See—*
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Pracht, Hans J.; and Iding, Stephen H., to Procter & Gamble Company, The. Capsules, process of their preparation and fabric conditioning composition containing said capsules. 4,018,688, Cl. 252-8.600.
Prast, Gijsbert; Mijnheer, Andries; and Mulder, Jan, to U.S. Philips Corporation. Pressing block for die pressing thermoplastic material. 4,018,552, Cl. 425-407.000.
Preissinger, Karl-Heinz; Voelkl, Walter; Weber, Willi; and Wehnelt, Ulrich, to Siemens Aktiengesellschaft. Corrosion-resistant regenerable electrical capacitor. 4,019,101, Cl. 361-313.000.
Prewitt, Era Pauline. Folding basin. 4,017,915, Cl. 4-177.00R.
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Prochnow, Claus, to Rollei-Werke Franke & Heidecke. Flash apparatus with cable storage space. 4,019,041, Cl. 240-1.300.
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Raffauf, Alois; and Wolfle, Eduard, to Girling Limited. Welding apparatus. 4,019,012, Cl. 219-79.000.
Raghavan, N.V. Vijaya, to American Micro-Systems, Inc. Liquid crystal device, composition therefor, and method for preparing the composition. 4,018,507, Cl. 350-160.0LC.
Raith, Richard L.; and Davenport, Joseph A., to Hauserman, Inc. Panel and structural units for wall assemblies. 4,018,019, Cl. 52-239.000.
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Rand, Earl W., Jr. Fuel saving apparatus for multiple cylinder internal combustion engines. 4,018,204, Cl. 123-198.00F.
Rankins, Everett V.; and Foster, Raymond Keith. Draft attachment for wheeled implements. 4,018,294, Cl. 180-13.000.
Rao, Durvasula V.; and Stuber, Fred A., to Upjohn Company, The. Process for the preparation of cycloalkane-1,2-diones. 4,018,827, Cl. 260-586.00P.
Rastogi, Vijay; Budd, James Michael; and Koehler, Daniel Lynn, to B. F. Goodrich Company, The. Rim construction for wheels having brake torque drives. 4,018,482, Cl. 301-6.00E.
Rathe, John C., to Rockwell International Corporation. Synchro rate generator. 4,019,145, Cl. 328-133.000.
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Rausch, Richard E., to UOP Inc. Hydrocarbon isomerization process. 4,018,839, Cl. 260-666.00R.
Rausch, Richard E., to UOP Inc. Hydrocarbon isomerization process. 4,018,845, Cl. 260-683.200.
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Reid, Lloyd E.; and Gudelis, David A., to Exxon Research and Engineering Company. Process for producing low pour point transformer oils from paraffinic crudes. 4,018,666, Cl. 208-36.000.
Reinhardt, Robert M.; Daigle, Donald J.; and Kullman, Russell M. H., to United States of America, Agriculture. Durable press finishing with catalysis by triazaphosphaadamantane derivatives. 4,018,950, Cl. 427-381.000.
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Rennie, Thomas. Support for anesthetic gas delivery hoses and endotracheal tubes. 4,018,221, Cl. 128-185.000.
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Richmond, Raymond; Parmer, Edward; and Parmer, Edward G., Jr. Anti-theft vehicle brake-supervising device. 4,018,314, Cl. 188-353.000.
Richtermeier Heinrich, to Volkswagenwerk Aktiengesellschaft. Door system for vehicles. 4,018,475, Cl. 296-28.00R.
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Rutledge, James T. Bicycle-mounted noise maker. 4,018,450, Cl. 280-289.00R.
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Salmond, Kent A.; and Pejcha, Ivan, to Information Storage Systems, Inc. Disc drive with rotary access mechanism. 4,019,205, Cl. 360-105.000.

Salters, Roelof Herman Willem: *See*—
Lohstroh, Jan; and Salters, Roelof Herman Willem, 4,019,197.
Salvesen, Harold L. Carton carrier. 4,018,467, Cl. 294-31.200.
Salway, Peter Hugh, to Lucas Electrical Company Limited, The. Spark ignition systems for internal combustion engines. 4,018,197, Cl. 123-117.00D.
Sami, Yasuo, to Sanyo Electric Co., Ltd. Automatic tape stopping detective device in a magnetic recording and reproducing apparatus. 4,018,404, Cl. 242-200.000.
Sandborn, Edmund B.: *See*—
Szasz, I. Emery; and Sandborn, Edmund B., 4,018,356.
Sandoz Ltd.: *See*—
Littlewood, Peter Stuart; and Mercer, Alec Victor, 4,018,789.
Sandstrom, Paul H.: *See*—
Saracsan, Jeffrey W.; and Sandstrom, Paul H., 4,018,948.
Sanyo Electric Co., Ltd.: *See*—
Sami, Yasuo, 4,018,404.
Sanyo Trading Co., Ltd.: *See*—
Onizawa, Masao, 4,018,749.
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Saracsan, Jeffrey W.; and Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The. Method of compounding rubber. 4,018,948, Cl. 427-316.000.
Sarkisian, Arthur: *See*—
LaPolla, Edmund M.; Murphy, Charles F.; and Sarkisian, Arthur, 4,018,681.
Sasena, John J., to Eaton Corporation. Fastener for fence construction and fencing system utilizing same. 4,018,425, Cl. 256-54.000.
Sato, Akira: *See*—
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 4,018,610.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Printing head for printing bar code characters. 4,018,157, Cl. 101-110.000.
Satoh, Ken, to Olympus Optical Co., Ltd. Battery checker circuit. 4,019,112, Cl. 320-48.000.
Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. 5-Phenyl-thiazolidin-4-one derivatives. 4,018,775, Cl. 260-293.680.
Satzinger, Gerhard: *See*—
Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, 4,018,793.
Saucy, Gabriel: *See*—
Scott, John William; Parrish, David Richard; and Saucy, Gabriel, 4,018,799.
Sauer, Gale E.; and Hansen, Barton G., to Roblin Industries, Inc. Modular wall construction. 4,018,020, Cl. 52-241.000.
Saunders, Dennis L.; and Caldwell, John C., to Union Oil Company of California. Automatic liquid mixing device. 4,018,685, Cl. 210-141.000.
Saunders, Norman B. Heating and ventilation system. 4,018,214, Cl. 126-271.000.
Sautter, Wilfried: *See*—
Stumpp, Gerhard; Wessel, Wolf; Stein, Volkhard; and Sautter, Wilfried, 4,018,200.
Savor, Dennis Edward: *See*—
Leshem, Adam; Marugg, Martin Lewis; and Savor, Dennis Edward, 4,018,346.
Scarpellino, Richard J., to General Foods Corporation. Coloring food with iron-complexes. 4,018,907, Cl. 426-250.000.
Schaeffer-Homberg GmbH, Firma: *See*—
Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,017,945.
Schaffner, Heinz: *See*—
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,018,809.
Schaffner, Otto: *See*—
Rehn, Karl; Schaffner, Otto; and Stahler, Gerhard, 4,018,819.
Schally, Andrew Victor; and Coy, David Howard. [D-Phe⁶]-LH-RH and intermediates therefor. 4,018,726, Cl. 260-8.000.
Schantz, John S., to Shantz, Raymond G.; and Schantz, Socrates J., part interest to each. Finger nail retainer and tweezer. 4,017,923, Cl. 7-1.00C.
Schantz, Socrates J.: *See*—
Schantz, John S., 4,017,923.
Schaub, Robert Eugene; Bernady, Karel Francis; and Weiss, Martin Joseph, to American Cyanamid Company. 3-Alkyl-2-(6-carboxyhexyl)cyclopentanones and esters and salts thereof. 4,018,811, Cl. 260-468.00K.
Scheinecker, Alois; and Kagerhuber, Franz, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Continuous casting plant strand guiding means. 4,018,261, Cl. 164-282.000.
Scheingold, William Samuel; and Youngfleish, Frank Christian, to AMP Incorporated. Interconnection for electrically connecting two vertically stacked electronic packages. 4,018,494, Cl. 339-17.0CF.
Schenk, Hanspeter: *See*—
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Scherer, Reiner: *See*—
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Schiessler, Siegfried: *See*—
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Schimmer, Rigobert: *See*—
Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, 4,018,373.
Schladitz, Hermann J., to Schladitz-Whiskers, A.G. Electric resistance fluid heating apparatus. 4,019,021, Cl. 219-381.000.
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Schlagel, Carl A.: *See*—
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Schlaupitz, Manfred: *See*—
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Schlegel, Herold M. Fire hose cabinet. 4,018,242, Cl. 137-355.180.
Schluter, Siegfried Hans-Dietmar, to Apparatebau Rothemuhle Brandt & Kritzler. Regenerative air preheater. 4,018,265, Cl. 165-7.000.
Schmalz, Roman, to Logemann Brothers Company. Method and apparatus for processing metal material into bales. 4,018,169, Cl. 100-39.000.
Schmerling, Louis: *See*—
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Schmidt, Bruce E.: *See*—
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Schmidt, Gunter, to Cubic Productron Inc. Daylight film handling system. 4,018,033, Cl. 53-381.00R.
Schmidt, Horst, to Sulzer Turbomaschinen AG. Apparatus for intermittently turning a turbine shaft. 4,018,094, Cl. 74-128.000.
Schmidt, Howard, to Chrysler Corporation. Machinable powder metal parts. 4,018,632, Cl. 148-126.000.
Schmidt, Louis F.: *See*—
United States of America, National Aeronautics and Space Administration; Schmidt, Louis F.; and Pace, George D., Jr., 4,018,532.
Schmidt, Paul, to Tracto-Technik Paul Schmidt. Hydraulically driven vibrator. 4,018,290, Cl. 173-49.000.
Schmiegel, Klaus K.: *See*—
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Schmitt, Wilfried: *See*—
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Schneehage, Hans Henning: *See*—
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Schneider, William P., to Upjohn Company, The. Intermediate for synthesis of Thromboxane B_2. 4,018,804, Cl. 260-410.90R.
Schneiders, Ernst; and Klocker, Wilhelm, to Hoechst Aktiengesellschaft. Process for flanging polytetrafluoroethylene pipes. 4,018,863, Cl. 264-249.000.
Schober, Donald Lincoln, to Union Carbide Corporation. Composition with triallyl compounds and process for avoiding scorching of ethylene polymer composition. 4,018,852, Cl. 260-878.00R.
Schoenafinger, Eduard: *See*—
Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, 4,018,882.
Schoenmakers, Theodorus Maria Berendina, to U.S. Philips Corporation. Gas discharge electron gun for generating an electron beam by means of a glow discharge. 4,019,091, Cl. 313-111.800.
Schofield, Minnie, to Raymond Lee Organization, Inc., The, a part interest. Door stop. 4,017,939, Cl. 16-82.000.
Scholtholt, Josef: *See*—
Raabe, Thomas; Scholtholt, Josef; and Nitz, Rolf-Eberhard, 4,018,778.
Schoop, Traugott K. Expansion joint means. 4,018,017, Cl. 52-58.000.
Schorr, Manfred; Schrinner, Elmar; and Schmitt, Wilfried, to Hoechst Aktiengesellschaft. Acylaminopenicillanic acids and process for preparing them. 4,018,933, Cl. 424-271.000.
Schottel-Werft Josef Becker KG: *See*—
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Schrader, Charles E. Gauze impregnator. 4,018,186, Cl. 118-405.000.
Schrape, Peter; and Worner, Gunter, to Daimler-Benz Aktiengesellschaft. Clutch disk for motor vehicle main clutches. 4,018,320, Cl. 192-106.200.
Schrinner, Elmar: *See*—
Schorr, Manfred; Schrinner, Elmar; and Schmitt, Wilfried, 4,018,933.
Schroeder, Guenter: *See*—
Gruber, Wilhelm; and Schroeder, Guenter, 4,018,829.
Schroter, Herbert, to Hoechst Aktiengesellschaft. Method of and apparatus for controlling the exposure time in an apparatus for the re-enlargement of microfilms. 4,018,526, Cl. 355-68.000.
Schubart, Rolf, to Dorst-Keramikmaschinen-Bau Inh. Otto Dorst u. Dipl.-Ing. Walter Schlegel. Method and a device for the production of ceramic mouldings, and more especially of magnetized ferrite mouldings. 4,018,857, Cl. 264-24.000.
Schubert, Anthony E.: *See*—
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Schueler, Marlin Alios, to American/Durein Company. Separator for handling multi-folded paper. 4,018,431, Cl. 270-52.500.
Schulmeister, Robert: *See*—
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Schulte Elektrotechnik KG, Firma: *See*—
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Schulte, Siegfried; and Schmitt, Wilheim, to Schulte Elektrotechnik KG, Firma. Method of manufacturing electrical machinery having a rotor. 4,017,964, Cl. 29-596.000.
Schultz, Edward D. Backstacking apparatus. 4,018,323, Cl. 198-508.000.
Schultz, William J., to General Electric Company. Method for making a gas sensor assembly. 4,017,950, Cl. 29-25.150.
Schulz, Gordon, to Odetics, Inc. Cassette loader for video recorder/reproducer. 4,018,403, Cl. 242-198.000.
Schulz, Hansrichard. Photoelectric transducing unit and system for detecting the sharpness of the image of object by means of the unit. 4,019,049, Cl. 250-211.00R.
Schulz, Johann G. D.: *See*—
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Schutze, Herbert: *See*—
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Schwan, Thomas J., to Morton-Norwich Products, Inc. 4′,5′-Dimethoxy-2′,3-diaminopropiophenone dihydrochloride. 4,018,823, Cl. 260-570.50C.
Schweikert, Karl, to Robert Bosch G.m.b.H. Windshield wiper arrangement. 4,017,936, Cl. 15-250.320.
Schwender, Charles F.; and Shavel, John, Jr., to Warner-Lambert Company. 5-Hydroxy-α-(substituted aminomethyl)-m-xylene-α,α′-diols. 4,018,825, Cl. 260-570.600.
Schwuttke, Guenter H.; and Yang, Kuei-Hsiung, to International Business Machines Corporation. Impact sound stressing for semiconductor devices. 4,018,626, Cl. 148-1.500.
Scire, Frank J.: *See*—
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Scott, John William; Parrish, David Richard; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Antioxidant chroman compounds. 4,018,799, Cl. 260-345.500.
Scott, Robert: *See*—
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Scott, Timothy F.: *See*—
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Scripps, Charles L.; and Yetter, Jerry J., to Procter & Gamble Company, The. Amine-stabilized dry powder aerosol antiperspirant compositions and method of preparation. 4,018,888, Cl. 424-47.000.
Scriven, Roger L.: *See*—
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Seckler, David W.; Harper, Judson M.; and Gaynor, William Wayne, to Ceres Ecology Corporation. Process for recovering feed products from animal manure. 4,018,899, Cl. 426-55.000.
Seer, Harold George, Jr., to RCA Corporation. Negative gamma circuit. 4,018,988, Cl. 358-164.000.
Segeren, Antonius Johannes Maria; and Boskamp, Jelles Vincent, to Thomas J. Lipton, Inc. Protein fibers. 4,018,903, Cl. 426-104.000.
Segerstrom, Lars, to Aktiebolaget Imo-Industri. Screw pump. 4,018,549, Cl. 418-197.000.
Seider, Gene J.; Freund, Michael C.; and Duffy, James R., to Gould Inc. Storage system for hot food trays. 4,019,022, Cl. 219-386.000.
Seiko Koki Kabushiki Kaisha: *See*—
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Shapiro, Jonathan S.: *See*—
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Sharkey, Melvin; and Newman, Douglas A. Continuous duplicating sheets. 4,018,162, Cl. 101-473.000.
Sharma, Vijay Ratna; and Taylor, John Anthony, to Imperial Chemical Industries Limited. Thioaminophosphazenes. 4,018,822, Cl. 260-551.00P.
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Shawhan, Elbert N., to Sperry-Sun, Inc. Lock-in noise rejection circuit. 4,019,148, Cl. 328-167.000.
Sheibley, Dean W.; and Gahn, Randall F., to United States of America, National Aeronautics and Space Administration. Gels as battery separators for soluble electrode cells. 4,018,971, Cl. 429-105.000.
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Sheridon, Nicholas K.; Kermisch, Dorian; and Bergen, Richard F., to Xerox Corporation. Deformation imaging system using thermoplastic and elastomeric layers. 4,018,603, Cl. 96-1.500.
Sherritt Gordon Mines Limited: *See*—
Genik-Sas-Berezowsky, Roman Michael, 4,018,595.
Shestopalov, Alexandr Andreevich: *See*—
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Shibayama, Kimio; and Yamanouchi, Kazuhiko, to Tokyo Shibaura Electric Co., Ltd. $LiNbO_3$ saw device. 4,019,074, Cl. 310-9.500.
Shibuya, Akira; and Nitta, Yoshifumi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Particle charging device for use in an electric dust collecting apparatus. 4,018,577, Cl. 55-137.000.
Shibuya, Teruo: *See*—
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Inouye, Ken; Shin, Masaru; and Watanabe, Kunio, 4,018,754.
Maeda, Ryozo; and Hirose, Katsumi, 4,018,785.
Shockey, Clyde J. Rotating head. 4,018,471, Cl. 294-90.000.
Shoemaker, Robert S.; Moyer, Donald H.; and Newman, Joseph J., to Bechtel International Corporation. Embedded housing for ore crusher. 4,018,396, Cl. 241-301.000.
Shoger, James. Recreational jouncing apparatus with vertical supports and removable board travel stops. 4,018,438, Cl. 272-65.000.
Short, Bruce H. Phonograph turntable. 4,018,447, Cl. 274-10.00R.
Shufflebarger, Earl D.; Kish, Edward E.; Cunningham, Frank M.; Boylan, John R.; and Murauskas, Donald J., to Nupro Company. Fluid strainer element. 4,018,686, Cl. 210-448.000.
Shumaker, John F., to J. I. Case Company. Vehicle stabilizer with adjustable foot. 4,018,458, Cl. 280-766.000.
Shuman, Jack N. Table for plastic forming apparatus. 4,018,551, Cl. 425-388.000.
Shupe, Russell D., to Texaco Inc. Surfactant oil recovery process usable in high temperature formations. 4,018,278, Cl. 166-252.000.
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Siemens, Dan H., Jr.; and Wheelwright, Earl J., to Minnesota Mining and Manufacturing Company. Apparatus for extraction of polonium - 210 from irradiated bismuth using molten caustic. 4,018,561, Cl. 23-267.00R.

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Silverman, Daniel; and Johnson, Everett A. Holographic systems having reference beam coded holograms. 4,018,503, Cl. 350-3.500.

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Simon, Eli. Chromated alkaline earth salts of bis(s-diphenylguanidinium benzenephosphonate) for the corrosion-inhibition of aluminum and ferrous alloys. 4,018,700, Cl. 252-389.00A.

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Sims, Willard M., to Foster Grant Co., Inc. High impact polyamides. 4,018,731, Cl. 260-23.70N.

Sinfelt, John H.; and Barnett, Allan E., to Exxon Research and Engineering Company. Hydrocarbon conversion process. 4,018,670, Cl. 208-140.000.

Singer, Barry M.; and Lalak, Joseph J., to North American Philips Corporation. Method of reducing the thickness of a wafer of fragile material. 4,018,638, Cl. 156-626.000.

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Sipe, Charles B. Hand rake with grasping tines. 4,018,038, Cl. 56-400.120.

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Sitek, George J.; and Berk, Charles W., to Leco Corporation. Arc control circuit. 4,019,017, Cl. 219-135.000.

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Sivertson, Wilford Eugene, Jr., to United States of America, National Aeronautics and Space Administration. Method of locating persons in distress. 4,019,179, Cl. 343-5.0MM.

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SKF Nova A.B.: *See—*
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Skoog, Ivan H., to Minnesota Mining and Manufacturing Company. Organic dye having fluoroaliphatic substituent. 4,018,810, Cl. 260-465.00D.

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Jones, Robert S.; Jones, Wesley E.; and Smathers, Harry W., 4,018,271.

Smaw, Jesse B., to Marcal Paper Mills, Inc. Article packaging machine. 4,018,031, Cl. 53-159.000.

Smith, Alvin E., to Atlantic Richfield Company. Fuel cycle management. 4,018,697, Cl. 252-301.10R.

Smith, April A. Ash tray. 4,018,235, Cl. 131-236.000.

Smith, Charles L.: *See—*
Webster, William C.; and Smith, Charles L., 4,018,619.

Smith, D. Kermit. Process and apparatus for dislodging and conveying material from a surface with a positive pressure fluid stream. 4,018,483, Cl. 302-25.000.

Smith, Herman W., to Upjohn Company, The. 13,14-Didehydro-PG$_2$ compounds. 4,018,803, Cl. 260-408.000.

Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,018,928.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,018,931.

Smith, Robert L.: *See—*
Cragoe, Edward J., Jr.; Bicking, John B.; and Smith, Robert L., 4,018,802.

Smith, Sumpter D.: *See—*
Cates, Raymond H., Jr.; Martin, Walter L., Jr.; and Smith, Sumpter D., 4,018,586.

SmithKline Corporation: *See—*
Berges, David Alan, 4,018,759.
Gleason, John Gerald, 4,018,921.

Smyrni, Emanuel S.; and White, Bobbie L., to Gym-Dandy, Inc. Cross arm hanger support. 4,018,538, Cl. 403-346.000.

Snyder, Edward J.; and Domyan, Stephen L., to Summagraphics Corporation. Position coordinate determination device. 4,018,989, Cl. 178-18.000.

Snyder, Jack C.: *See—*
Peterson, Donald C.; and Snyder, Jack C., 4,017,997.

Snyder, Michael D., to Universal Instruments Corporation. Belted axial lead electronic component splicing clip crimping tool. 4,018,074, Cl. 72-410.000.

Societa' Farmaceutici Italia S.p.A.: *See—*
Foglio, Maurizio; Masi, Paolo; Suarato, Antonino; and Franceschi, Giovanni, 4,018,776.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,872.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,873.

Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See—*
Bulliot, Georges Leon Marcel, 4,018,062.

Societe Anonyme D.B.A.: *See—*
Mery, Jean-Claude, 4,018,309.
Monpetit, Louis, 4,018,419.

Societe Anonyme dite: L'Oreal: *See—*
Kalopissis, Gregoire; and Bugaut, Andree, 4,018,556.

Societe Anonyme Francaise du Ferodo: *See—*
Landreau, Jean Florent Francois Marcel Robert, 4,018,139.

Societe Anonyme pour l'Equipement Electrique des Venicules S. E. V. Marchal: *See—*
Jacob, Pascal Marie Henri; and Guicheseux, Gerard Pierre, 4,018,335.

Societe d'Application Plastique Mecanique et Electronique, Plastimecanique S.A.: *See—*
Donnet, Henry, 4,018,028.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
Buhler, Marcel; Bohren, Hans-Ueli; and Hodel, Theodore, 4,018,752.

Societe Industrielles des Etablissements Piel: *See—*
Piel, Michel, 4,017,926.

Societe Nationale Elf Aquitaine (Production): *See—*
Peruchon, Edouard; and Rabischong, Pierre, 4,017,978.

Sodal, Ingvar E.; Hoivik, Lars; Micco, Alexander J.; Weil, John V.; and Baer, Norman W., to University of Colorado, The Regents of the. Method and inlet control system for controlling a gas flow sample to an evacuated chamber. 4,018,241, Cl. 137-14.000.

Soffer, Anita. Humidifying plant table. 4,018,004, Cl. 47-39.000.

Soja, Frank John, to Alta Engineering, Inc. Lock screw for rigging connector or the like. 4,017,946, Cl. 24-265.0AL.

Sokolsky, Dmitry Vladimirovich: *See—*
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich, 4,018,835.

Somar Manufacturing Co., Ltd.: *See—*
Takahashi, Nobuyasu; Yamaguchi, Talichi; Sakaguchi, Junei; and Hamada, Hideo, 4,018,645.

Sonoco Products Company: *See—*
Cunningham, McCleery B., 4,018,401.

Sorbier, Pierre, to Agence Nationale de Valorisation de la Recherche (ANVAR). Shredding machine for fibrous materials. 4,018,394, Cl. 241-200.000.

Sorli, Duncan C.: *See—*
Cutler, Norman W., Jr.; and Sorli, Duncan C., 4,019,194.

Sotman, Kurt; and Nash, John E., to Star Dental Manufacturing Co., Inc. Handpiece with adjustable water spray. 4,017,974, Cl. 32-28.000.

Soulal, Maurice John; and Utting, Kenneth, to Beecham Group Limited. Esters of metrizoic acid. 4,018,783, Cl. 260-343.30R.

Spangler, Morris H., to Reflector Hardware Corporation. Preassembled bracket and shelf assembly. 4,018,167, Cl. 108-152.000.

Sperry, Elmer Ambrose, III: *See—*
Dzula, Gregory; Levine, Melvin; and Sperry, Elmer Ambrose, III, 4,018,089.

Sperry Rand Corporation: *See—*
Freitag, Walter O., 4,018,495.
Rowland-Hill, Edward W.; and Todd, Robert R., 4,018,232.

Sperry-Sun, Inc.: *See—*
Shawhan, Elbert N., 4,019,148.

Sperry-Sun Well Surveying Company: *See—*
McArthur, Billy Walton, 4,018,088.

Spicer, Larry Dean; Quinlan, James Michael; and Berger, Harold, to American Cyanamid Company. Anthelmintic pour-on formulations for topical use on domestic and farm animals. 4,018,932, Cl. 424-270.000.

Spielberg, David H.: *See—*
Youtsey, Karl J.; Holt, William C., Jr.; Carnahan, Robert D.; and Spielberg, David H., 4,018,943.

Spietschka, Ernst; Schiessler, Siegfried; and Tronich, Wolfgang, to Hoechst Aktiengesellschaft. Process for the preparation of highly pure halogenated phthalocyanine pigment. 4,018,791, Cl. 260-314.500.
Spiller, Eberhard A.: *See—*
Feder, Ralph; and Spiller, Eberhard A., 4,018,938.
Spisak, Steve, to TRW Inc. Apparatus for welding studs. 4,019,013, Cl. 219-98.000.
Spriggs, Samuel C. Stopper remover. 4,018,110, Cl. 81-3.10B.
Sprinter Pack AB: *See—*
Persson, Karl Rune, 4,018,378.
Square D Company: *See—*
Beavitt, Alan R., 4,019,163.
Srodes, Paul G., to Honeywell Inc. Central supervisory and control system generating 16-bit output. 4,019,172, Cl. 340-146.10C.
Stadler, Josef: *See—*
Zeuch, Klaus; and Stadler, Josef, 4,018,566.
Stafford, Jerrett D.: *See—*
Lee, Stuart M.; and Stafford, Jerrett D., 4,018,374.
Staggers, John O., to Foote Mineral Company. Rare earth metal silicide alloys. 4,018,597, Cl. 75-58.000.
Stahler, Gerhard: *See—*
Rehn, Karl; Schaffner, Otto; and Stahler, Gerhard, 4,018,819.
Stanbel, Incorporated: *See—*
Aber, Arthur B., 4,018,407.
Standard Oil Company (Indiana): *See—*
Bertolacini, Ralph J., 4,018,711.
Standley, Robert S., to Armco Steel Corporation. Yieldable joint. 4,018,054, Cl. 61-45.00R.
Stanik, Raimund: Appelt, Horst Gustav; and Ramspott, Walter, to Schaeffer-Homberg GmbH, Firma. Fastener for pockets, cases or the like. 4,017,945, Cl. 24-208.00R.
Stanley Electric Co., Ltd.: *See—*
Teshima, Toru; Kashiwabara, Hoichiro; and Uchiyama, Yoshinori, 4,019,196.
Staples, Ernest L., Jr., to Xerox Corporation. Method of assembling a composite print wheel. 4,018,639, Cl. 156-73.100.
Star Dental Manufacturing Co., Inc.: *See—*
Sotman, Kurt; and Nash, John E., 4,017,974.
Stauffer Chemical Company: *See—*
Baker, Don R., 4,018,800.
Baker, Don Robert, 4,018,894.
Gaughan, Edmund J., 4,018,813.
Gutman, Arnold D., 4,018,917.
Steel Company of Canada, Limited, The: *See—*
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Steelcase, Inc.: *See—*
Faiks, Frederick S., 4,018,102.
Steiman, Wolf. Booklet type cosmetic compact. 4,018,237, Cl. 132-83.00R.
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Steinemer, Norbert: *See—*
Kohler, Werner; and Steinemer, Norbert, 4,019,008.
Steiner American Corporation: *See—*
Cassia, Antonio Macchi, 4,018,363.
Steinman, Martin, to Schering Corporation. Methods for treating microbial infections. 4,018,893, Cl. 424-285.000.
Stelzer, William. Louvered windows comprising insulating pairs of superimposed panes. 4,018,024, Cl. 52-473.000.
Stenkvist, Sven-Einar: *See—*
Andersson, Conny; and Stenkvist, Sven-Einar, 4,018,974.
Stepan Chemical Company: *See—*
Blackwood, John C., 4,018,333.
Sterling Drug Inc.: *See—*
Lesher, George Y.; and Singh, Baldev, 4,018,770.
Sternbach, Leo Henryk: *See—*
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Steuer, Siegfried: *See—*
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Stewart, Bruce Edmund: *See—*
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Stier, Otto, to Vollmer Werke Maschinenfabrik GmbH. Saw sharpening machine. 4,018,107, Cl. 76-41.000.
Stier, Otto, to Vollmer Werke Maschinenfabrik GmbH. Feed device for saw machining apparatus. 4,018,109, Cl. 76-77.000.
Stiller, Armin, to Rollei-Werke Franke & Heidecke. Photographic flash apparatus. 4,019,092, Cl. 315-159.000.
Stobb, Inc.: *See—*
Stobb, Walter John, 4,018,351.
Stobb, Walter John, to Stobb, Inc. Apparatus for handling bundles of sheets. 4,018,351, Cl. 214-314.000.
Stochel, Nathan Harold: *See—*
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Stockhausen, Paul E.: *See—*
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Stolberg, Hermann Josef: *See—*
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Stoll, Max: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; and Stoll, Max, 4,018,910.
Stone, Jack C. Granular-floor supported cargo hauling trailer apparatus construction. 4,018,480, Cl. 298-27.000.
Stone, Wayne B., Jr. Method for edge marking recordable webs. 4,018,947, Cl. 427-284.000.
Stone, William David; and Bonner, Alvin Truit, Sr., to Singer Company, The. Yarn tensioning means for tufting machines. 4,018,171, Cl. 112-79.00R.
Stonebraker, Robert E. Cutting instrument. 4,017,969, Cl. 30-156.000.
Stoops, Bobby G., to Don R. Hinderliter, Inc. Gate latching mechanism for hoist hook. 4,018,469, Cl. 294-82.00R.
Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, to Warner-Lambert Company. Benzo (b) thiophene derivatives. 4,018,793, Cl. 260-330.500.
Strauss, Friedrich, to Amann & Sohne. Cassette for dispensing yarn reels. 4,018,360, Cl. 221-310.000.
Stroll, Michael R.: *See—*
Wu, Paul S.; and Stroll, Michael R., 4,018,504.
Strossner, Manfred, to Siemens Aktiengesellschaft. Overcurrent and short circuit protection device. 4,019,006, Cl. 200-144.00R.
Stuber, Fred A.: *See—*
Rao, Durvasula V.; and Stuber, Fred A., 4,018,827.
Studebaker, Thomas J.: *See—*
Robinson, Max S.; and Studebaker, Thomas J., 4,018,999.
Stumpp, Gerhard; Wessel, Wolf; Stein, Volkhard; and Sautter, Wilfried, to Robert Bosch G.m.b.H. Fuel injection system with fuel pressure control valve. 4,018,200, Cl. 123-139.0AW.
Stutt, Colin; Noble, Anthony John; and Ford, Reginald Arthur, to Masson Scott Thrissell Engineering Limited. Flap folding mechanism for carton making machines. 4,018,144, Cl. 93-52.000.
Suarato, Antonino: *See—*
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Suchard, Jean F.: *See—*
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Suga, Michio: *See—*
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Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Niroyuki; and Maruya, Takashi, to Mizusawa Kagaku Kogyo Kabushiki Kaisha. Water glass composition. 4,018,616, Cl. 106-74.000.
Sugawara, Yutaka: *See—*
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Sugiura, Toshio, to Nippon Gakki Seizo Kabushiki Kaisha. Automatic rhythm performing apparatus capable of expressing stressed and relaxed beats of rhythm. 4,018,123, Cl. 84-1.030.
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Suketomo, Toshitaka: *See—*
Wagatsuma, Toshiaki; Suketomo, Toshitaka; Yoshida, Kouki; and Suga, Michio, 4,018,452.
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Sulzer Brothers Limited: *See—*
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Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, 4,018,739.
Sumitomo Metal Industries, Ltd.: *See—*
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Summagraphics Corporation: *See—*
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Sun Electric Corporation: *See—*
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Superior Oil Company, The: *See—*
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Sutton, Christopher John, to Lucas Electrical Company Limited, The. Vehicle wheel slide protection systems. 4,018,486, Cl. 303-97.000.
Suzuki, Fukushi: *See—*
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Suzuki, Kuniomi: *See—*
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Suzuki, Yasuhiro; and Yamaguchi, Katsuhiko, to Nitto Electric Industrial Co., Ltd. Imide-ring containing polyester and wire enamel containing same. 4,018,742, Cl. 260-75.00N.
Suzuki, Yasushi: *See—*
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Svekis, Imants J., to Canadian Chromalox Company, Limited, The. Housing structure for electrical apparatus. 4,018,982, Cl. 174-65.00R.
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Swanson, Gladys B. Trailer anchoring device. 4,018,015, Cl. 52-23.000.
Swanson, Rollan. Desulfurization of fossil fuels. 4,018,572, Cl. 44-1.00R.
Sweda International, Inc.: *See—*
Wu, Paul S.; and Stroll, Michael R., 4,018,504.
Sweeney, William A.; and Simic, Milutin, to Chevron Research Company. Separation of hydrocarbon mixtures by alkyl displacement. 4,018,657, Cl. 203-38.000.
Swerdlow, Richard Barry, to Bell Telephone Laboratories, Incorporated. Methods and apparatus for reducing intelligible crosstalk in single sideband radio systems. 4,019,140, Cl. 325-65.000.
Swiss Aluminium Ltd.: *See—*
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Synestructics, Inc.: *See—*
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Szabo, Lester J., to Kennecott Copper Corporation. Metal carbonate recycle to reduction circuit in the cuprion process. 4,018,866, Cl. 423-32.000.
Szasz, I. Emery; and Sandborn, Edmund B. Floating deck for liquid storage tank. 4,018,356, Cl. 220-220.000.
Taisei Kensetsu Kabushiki Kaisha: *See—*
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Takahashi, Nobuyasu; Yamaguchi, Taiichi; Sakaguchi, Junei; and Hamada, Hideo, to Somar Manufacturing Co., Ltd. Method of controlling slime during paper manufacture using alpha-chloro-acylbenzaldoxime derivatives. 4,018,645, Cl. 162-76.000.
Takahashi, Sadao: *See—*
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Takahashi, Yasuo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photographic wide angle lens. 4,018,511, Cl. 350-214.000.
Takamizawa, Kinya, to Tokyo Shibaura Electric Co., Ltd. Ultrasonic wave transmitting and receiving apparatus. 4,019,169, Cl. 340-1.00R.
Takano, Teruhisa: *See—*
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Takeda, Yoshiro: *See—*
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Tallman, Erven. Portable lifting jack. 4,018,421, Cl. 254-8.00B.
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Tamiz, Farouq M. Step-counting shoe. 4,019,030, Cl. 235-105.000.
Tanaka, Junzo; Matsushima, Haruo; and Abe, Yukio, to Matsushita Electric Industrial Co., Ltd. Microwave oven with uniform electric field distribution. 4,019,010, Cl. 219-10.55F.
Tanaka, Yoshio: *See—*
Ohkawa, Masaaki; Tanaka, Yoshio; Takeda, Yoshiro; Kinoshita, Tadao; and Hirabayashi, Kazuyoshi, 4,018,756.
Tani formerly Nishikawa, Tatsuo; and Ariyama, Kenzo, to Ricoh Co., Ltd. Construction for use with an electrophotographic copying machine of wet developing type. 4,018,524, Cl. 355-10.000.
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Taniguchi, Tadasu; Hosaka, Iwao; and Kato, Shigehiro, to Canon Kabushiki Kaisha; and Canon Denshi Kabushiki Kaisha. Card conveyor device. 4,019,025, Cl. 235-61.11R.
Tanner, Randall Curtis, to Cincinnati Milacron, Inc. Method and apparatus for controlling the initiation of multiple start threading cuts. 4,019,035, Cl. 235-151.110.
Tatarenko, Galina: *See—*
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Tatum, Harold E.: *See—*
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Tatum, Joe F. Ground electrode backfill composition. 4,018,715, Cl. 252-510.000.
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Taylor, Lynn J., to Owens-Illinois, Inc. Chemically convertible tape with in situ synthesized polymer. 4,018,727, Cl. 260-13.000.
Teer, Glenn E.; Higgins, Jerry G.; Warren, George D.; and Ewert, Donald C., to Coeden Technology, Inc. Emulsions of ethylene polymers and copolymers with controlled molecular weight and particle size. 4,018,737, Cl. 260-29.6XA.
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Telcon-Magnetic Cores Limited: *See—*
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Tenud, Leander, to Lonza Ltd. Process for the production of carnitine. 4,018,821, Cl. 260-534.00M.
Teodorescu, Constantin; and Costache, Corneliu Vladut, to Institutul Pentru Creatie Stintifica si Tehnica-Increst. Method of and apparatus for the combustion of liquid fuels. 4,018,554, Cl. 431-9.000.
Terada, Yutaka: *See—*
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Terry, Ruel Carlton, to In Situ Technology, Inc. Gasification of coal in situ. 4,018,481, Cl. 299-4.000.
Teshima, Toru; Kashiwabara, Hoichiro; and Uchiyama, Yoshinori, to Stanley Electric Co., Ltd. Indicating element and method of manufacturing same. 4,019,196, Cl. 357-17.000.
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Th. Kieserling & Albrecht: *See—*
Heiermann, Klaus; Pohler, Carl-Ludwig; and Bertenburg, Joachim, 4,018,114.
Thettu, Raghulinga R., to Xerox Corporation. Cleaning apparatus for roll fuser. 4,018,555, Cl. 432-75.000.
Theysohn, Helmuth. Stripping and depositing mechanism for calendered sheets. 4,018,550, Cl. 425-363.000.
Thiele Kaolin Company: *See—*
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Thomas, Robert L., to Clark Equipment Company. Synchronizer assembly. 4,018,319, Cl. 192-53.00E.
Thompson, Francis T., to Westinghouse Electric Corporation. CRT display and record system. 4,019,040, Cl. 235-92.0SH.
Thompson, James L., to Dow Chemical Company, The. Composition and method for reducing the surface tension of aqueous fluids. 4,018,689, Cl. 252-8.55C.
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Thorn, Lawrence B.; and Dreitzler, David R., to United States of America, Army. Aerosol average-density determining system. 4,018,534, Cl. 356-201.000.
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Tickle, Colin John Frederick, to Girling Limited. Rotor and braking ring disc assembly. 4,018,311, Cl. 188-218.0XL.
Tietje, Helmut G., to Lube Systems Corporation. Lubricant metering assembly. 4,018,305, Cl. 184-45.00R.
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Tinti, Pietro. Thermo-electric assemblies. 4,018,625, Cl. 136-225.000.
Tischler, Henry J., to Gulf & Western Metals Forming Company. Furniture deck construction. 4,017,922, Cl. 5-354.000.
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Tollefson, Charles I.; Jackel, Simon S.; and Krum, Jack K., to R. T. French Company. Method of using potato supplement in commercial bread making processes. 4,018,898, Cl. 426-21.000.
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Tye, Dennis W., to Superior Concrete Accessories, Inc. Anchor insert for embedment in a concrete slab. 4,018,470, Cl. 294-89.000.
Ubaud, Patrick, to Union Chimique Continentale-U.C.C. Automatic control for liquid flow. 4,018,362, Cl. 222-55.000.
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
Appleberry, Walter Thomas. Mechanical sequencer. 4,018,092, Cl. 74-96.000.
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Podgorski, Ted J. Method of forming shrink-fit compression seal. 4,017,959, Cl. 29-447.000.
Schmidt, Louis F.; and Pace, George D., Jr. Sun direction detection system. 4,018,532, Cl. 356-141.000.
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van der Lely, Ary; and Bom, Cornelis Johannes Gerardus. Rotary harrows. 4,018,170, Cl. 111-7.000.

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Wagner, Stuart J. Fin comb with interchangeable heads. 4,018,076, Cl. 72-481.000.

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Walmann, Brian I. Tone generation and modification apparatus. 4,018,126, Cl. 84-1.240.
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Walters, Chester H.; Barmeier, Harold J., Jr.; and Sullivan, Greig E., to National Marine Service, Inc. Bilge water disposal system including oil recovery means. 4,018,683, Cl. 210-71.000.
Walters, Ian Richard; and Emblem, Harold Garton, to Zirconal Processes Limited. Method of manufacturing refractory articles. 4,018,858, Cl. 106-57.000.
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Watanabe, Tatsuo; and Saito, Hideki, to Kokusai Denshin Denwa Kabushiki Kaisha. Frequency synchronizing system for satellite communication. 4,019,138, Cl. 325-4.000.
Waters, William D., to Youngstown Sheet and Tube Company. Modified vinyl ester resin and pipe made therefrom. 4,018,250, Cl. 138-140.000.
Waterstrat, Richard M., to American Dental Association Health Foundation. Method for eliminating gamma$_2$ phase from dental amalgam and improved dental amalgam composition. 4,018,600, Cl. 75-169.000.
Watkins, Larry A., to Exxon Production Research Company. Method and apparatus for gravel packing wells. 4,018,283, Cl. 166-278.000.
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B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
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B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976	B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976	B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976	B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977	B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977	B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977	B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976	B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976	B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977	B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977	B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976	B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976	B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977	B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976	B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976	B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976	B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976	B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976	B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976	B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976	B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976	B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976	B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976	B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976	B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976	B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977	B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976	B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977	B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976	B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977				

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 19TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bell Telephone Laboratories, Incorporated: *See*—
Harrigan, Thomas George, Re. 29,191.
Braucht, Theodore C., to Mark K Industries. Automatic dredge pump rebuilder. Re. 29,190, Cl. 219-76.000.
Canon Kabushiki Kaisha: *See*—
Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, Re. 29,187.
Komori, Shigehiro; Sato, Juro; and Hattori, Hiroyuki, Re. 29,186.
Croughwell, William J., to Emhart Industries, Inc. Computer control for glassware forming machine. Re. 29,188, Cl. 65-163.000.
DEC International, Inc.: *See*—
Petranyi, John F., Re. 29,184.
Emhart Industries, Inc.: *See*—
Croughwell, William J., Re. 29,188.
Fischer, Russell C., to GTE Automatic Electric Laboratories Incorporated. Self-balancing hybrid circuit. Re. 29,189, Cl. 179-170.00D.
GTE Automatic Electric Laboratories Incorporated: *See*—
Fischer, Russell C., Re. 29,189.
Harrigan, Thomas George, to Bell Telephone Laboratories, Incorporated. Base reach-through active series voltage regulator. Re. 29,191, Cl. 321-18.000.
Hattori, Hiroyuki: *See*—
Komori, Shigehiro; Sato, Juro; and Hattori, Hiroyuki, Re. 29,186.
Hoerner Waldorf Corporation: *See*—
Tolaas, William M., Re. 29,185.
Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, to Canon Kabushiki Kaisha. Copying apparatus. Re. 29,187, Cl. 355-51.000.
Komori, Shigehiro; Sato, Juro; and Hattori, Hiroyuki, to Canon Kabushiki Kaisha. Electrophotographic copying apparatus of slit exposure type. Re. 29,186, Cl. 355-8.000.
Mark K Industries: *See*—
Braucht, Theodore C., Re. 29,190.
Petersdorf, Gerhard: *See*—
Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, Re. 29,187.
Petranyi, John F., to DEC International, Inc. Apparatus for dispensing liquid from a liquid supply manifold. Re. 29,184, Cl. 222-373.000.
Sandner, Winfried: *See*—
Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, Re. 29,187.
Sato, Juro: *See*—
Komori, Shigehiro; Sato, Juro; and Hattori, Hiroyuki, Re. 29,186.
Tolaas, William M., to Hoerner Waldorf Corporation. Wedge shaped carton. Re. 29,185, Cl. 229-22.000.

LIST OF PLANT PATENTEES

Kovacevich, John J. Nectarine tree. 4,042, 4-19-77, Cl. 41.000.

LIST OF DESIGN PATENTEES

A. Ahlstrom Osakeyhtio: *See*—
Wirkkala, Tapio, 244,064.
Augustin, Rolf M., Jr.; and Cutler, Norman W., Jr., to Polaroid Corporation. Photographic camera back or similar article. 244,089, 4-19-77, Cl. D16-10.000.
Baumler, Robert J.: *See*—
Wahi, Chander M.; and Baumler, Robert J., 244,095.
Bryant, William J. Child's compass. 244,091, 4-19-77, Cl. D19-38.000.
Charlton Co., Inc.: *See*—
Saltz, Richard B., 244,076.
Saltz, Richard B., 244,077.
Chicago Lock Co.: *See*—
Steinbach, Robert L., 244,081.
Christian, Hubert E., to Dart Industries Inc. Cup. 244,063, 4-19-77, Cl. D7-15.000.
Creamer, Joan Klatil, to General Electric Company. Wall plate. 244,082, 4-19-77, Cl. D8-351.000.
Cutler, Norman W., Jr.: *See*—
Augustin, Rolf M., Jr.; and Cutler, Norman W., Jr., 244,089.
Daenen, Robert H. C. M., to Dart Industries Inc. Serving bowl or the like. 244,065, 4-19-77, Cl. D7-23.000.
Dart Industries Inc.: *See*—
Christian, Hubert E., 244,063.
Daenen, Robert H. C. M., 244,065.
Haynes, Rodney R., Sr., 244,071.
Eaton Corporation: *See*—
Spencer, Clifford A., 244,100.
Fabian, Julian: *See*—
Giddings, Daniel S.; and Fabian, Julian, 244,085.
Formica Corporation: *See*—
Willard, Jack August, 244,094.
Frick, Berndt Ebbe. Housing for teleprinters and the like. 244,097, 4-19-77, Cl. D14-93.000.
Gannon, Peter F., to Vinyl-Fab Industries. Swimming pool safety ladder. 244,093, 4-19-77, Cl. D25-64.000.
General American Transportation Corporation: *See*—
Mowatt-Larssen, Erling; and Lapikas, Thomas S., 244,092.
General Electric Company: *See*—
Creamer, Joan Klatil, 244,082.
General Mills Fun Group, Inc.: *See*—
Goldberg, Dale I., 244,101.
Giddings, Daniel S.; and Fabian, Julian. Display package for mineral specimens. 244,085, 4-19-77, Cl. D9-193.000.
Gildea, Robert. Water lounge. 244,066, 4-19-77, Cl. D6-37.000.
Goldberg, Dale I., to General Mills Fun Group, Inc. Toy vehicle. 244,101, 4-19-77, Cl. D34-15.0AJ.
Greer, Michael M. Pocket finger exercise board. 244,103, 4-19-77, Cl. D56-1.00R.
Haines, Walter W., Sr. Neckwear. 244,061, 4-19-77, Cl. D2-351.000.
Haines, Walter W., Sr. Neckwear. 244,062, 4-19-77, Cl. D2-351.000.
Haynes, Rodney R., Sr., to Dart Industries Inc. Arm chair. 244,071, 4-19-77, Cl. D6-71.000.
Heckroth, Robert H. Can lid punch. 244,079, 4-19-77, Cl. D8-41.000.
Imber, Marion; and Wezenter, Seymour, to Ray Control Corporation. Table. 244,075, 4-19-77, Cl. D6-179.000.
Kilham, Peter. Bird feeder. 244,098, 4-19-77, Cl. D30-14.000.
Krasicki, Walter. Harp. 244,104, 4-19-77, Cl. D56-1.00A.
Lapikas, Thomas S.: *See*—
Mowatt-Larssen, Erling; and Lapikas, Thomas S., 244,092.
Lawrence, William James. Digital watch casing. 244,086, 4-19-77, Cl. D10-38.000.
Les Must de Cartier: *See*—
Perrin, Alain D., 244,080.
Marks, Robert J. Convertible sofa. 244,070, 4-19-77, Cl. D6-63.000.
Marks, Robert J. Furniture frame. 244,078, 4-19-77, Cl. D6-191.000.
Masters, Alois A.: *See*—
Urbaniec, Donald M.; Stanbrough, Jerry L.; and Masters, Alois A., 244,073.
Matsushita Electric Industrial Co., Ltd.: *See*—
Takenaka, Kazumasa; and Ohta, Kikuo, 244,102.
McCarroll, Raymond A. Rear-view mirror. 244,088, 4-19-77, Cl. D12-187.000.
Mecaniplast: *See*—
Pizon, Ernest, 244,096.

Mitchell, Bernard A. Fragrance bottle. 244,084, 4-19-77, Cl. D9-157.000.
Mowatt-Larssen, Erling; and Lapikas, Thomas S., to General American Transportation Corporation. Intermodal container. 244,092, 4-19-77, Cl. D23-2.000.
Ohta, Kikuo: *See—*
Takenaka, Kazumasa; and Ohta, Kikuo, 244,102.
Ozburn-Janesville Corporation: *See—*
Piekarski, John L., 244,105.
Patton, Gerald Thomas. Figurine. 244,087, 4-19-77, Cl. D11-160.000.
Perrin, Alain D., to Les Must de Cartier. Hinged lock for luggage or the like. 244,080, 4-19-77, Cl. D8-338.000.
Pfeiffer, Joachim A. Sail boat mast setting bracket. 244,083, 4-19-77, Cl. D8-354.000.
Piekarski, John L., to Ozburn-Janesville Corporation. Headlights reminder and coin holder. 244,105, 4-19-77, Cl. D87-3.00B.
Pizon, Ernest, to Mecaniplast. Plate-type antenna. 244,096, 4-19-77, Cl. D14-86.000.
Polaroid Corporation: *See—*
Augustin, Rolf M., Jr.; and Cutler, Norman W., Jr., 244,089.
Ray Control Corporation: *See—*
Imber, Marion; and Wezenter, Seymour, 244,075.
Robert, Tony. Wall mountable aquarium or similar article. 244,099, 4-19-77, Cl. D30-7.000.
Saltz, Richard B., to Charlton Co., Inc. Table. 244,076, 4-19-77, Cl. D6-177.000.
Saltz, Richard B., to Charlton Co., Inc. Shelf unit or similar article. 244,077, 4-19-77, Cl. D6-186.000.
Schaecher, John J. Barbecue tool cabinet. 244,072, 4-19-77, Cl. D6-128.000.
Spencer, Clifford A., to Eaton Corporation. Golf club grip. 244,100, 4-19-77, Cl. D34-5.0GS.
Stanbrough, Jerry L.: *See—*
Urbaniec, Donald M.; Stanbrough, Jerry L.; and Masters, Alois A., 244,073.
Steinbach, Robert L., to Chicago Lock Co. Key blank for an axial tumbler-type lock. 244,081, 4-19-77, Cl. D8-347.000.
Styron, Woodland McAdoo, Jr. Hanging chair. 244,068, 4-19-77, Cl. D6-47.000.
Summer, Leon. Convertible seat or similar article. 244,069, 4-19-77, Cl. D6-63.000.
Takenaka, Kazumasa; and Ohta, Kikuo, to Matsushita Electric Industrial Co., Ltd. Combined portable radio and tape recorder. 244,102, 4-19-77, Cl. D14-5.000.
Toledo Metal Furniture Company: *See—*
Uhl, Philip E., 244,067.
Uhl, Philip E., to Toledo Metal Furniture Company. Collapsible picnic table. 244,067, 4-19-77, Cl. D6-45.000.
Urbaniec, Donald M.; Stanbrough, Jerry L.; and Masters, Alois A. Audio and visual display booth. 244,073, 4-19-77, Cl. D6-157.000.
Vinyl-Fab Industries: *See—*
Gannon, Peter F., 244,093.
Wahi, Chander M.; and Baumler, Robert J. Capacitor. 244,095, 4-19-77, Cl. D13-21.000.
West, John Brownridge. Ruler. 244,090, 4-19-77, Cl. D19-35.000.
Wezenter, Seymour: *See—*
Imber, Marion; and Wezenter, Seymour, 244,075.
Willard, Jack August, to Formica Corporation. Deep textured decorative laminate sheet. 244,094, 4-19-77, Cl. D25-84.000.
Wirkkala, Tapio, to A. Ahlstrom Osakeyhtio. Plate. 244,064, 4-19-77, Cl. D7-23.000.
Zoia, Colman. Buffet. 244,074, 4-19-77, Cl. D6-164.000.

CLASSIFICATION OF PATENTS

ISSUED APRIL 19, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

10	4,017,906
84	4,017,908
114	4,017,909
158	4,017,907
232	4,017,910

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1.5	4,017,911

CLASS 4

1	4,017,912
52	4,017,913
67 A	4,017,914
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213	4,017,916

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1 XB	4,018,557
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26	4,018,558
94.2	4,018,559
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309	4,017,925
331	4,017,926
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12	4,018,975

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210 B	4,017,935
250.32	4,017,936
327 R	4,017,937
346	4,017,938

CLASS 16

82	4,017,939

CLASS 17

32	4,017,940
41	4,017,941

CLASS 19

106 R	4,017,942

CLASS 23

230 B	4,018,564
230 PC	4,018,562
230 R	4,018,563
253 R	4,018,565
267 R	4,018,561
273 SP	4,018,566
285	4,018,567
288 F	4,018,568

CLASS 24

84 R	4,017,943
86 R	4,017,944
208 R	4,017,945
265 AL	4,017,946

CLASS 27

27	4,017,947

CLASS 28

46	4,017,948
77	4,017,949

CLASS 29

25.15	4,017,950
149.5 PM	4,017,951
157.3 R	4,017,952
157.3 V	4,017,953
252	4,017,957
268	4,017,958
401 E	4,017,960
447	4,017,959
450	4,017,961
564.8	4,017,955
572	4,017,962
577	4,017,963
596	4,017,964
603	4,017,965
	4,017,966
611	4,017,967
625	4,017,968
749	4,017,954
810	4,017,956

CLASS 30

156	4,017,969
169	4,017,970

CLASS 32

2	4,017,971
11	4,017,972
14 A	4,017,973
28	4,017,974
33	4,017,975

CLASS 33

1 LE	4,017,977
1 S	4,017,976
174 L	4,017,978
174 R	4,017,979

CLASS 34

13.4	4,017,980
26	4,017,981
31	4,017,982
92	4,017,983

CLASS 35

8 R	4,017,984
10.4	4,017,985
16	4,017,986

CLASS 36

11.5	4,017,987

CLASS 38

77.83	4,017,988

CLASS 40

2.2	4,017,994
68	4,017,993
128	4,017,991
138	4,017,992
152	4,017,989
322	4,017,990

CLASS 42

1 S	4,017,995
69 B	4,017,996
94	4,017,997

CLASS 43

21.2	4,017,998
44.99	4,017,999

CLASS 44

1 R	4,018,571
	4,018,572

CLASS 46

	4,018,000
19	4,018,001
105	4,018,002

CLASS 47

26	4,018,003
39	4,018,004

CLASS 48

107	4,018,573

CLASS 49

199	4,018,005

CLASS 51

9 R	4,018,006
26	4,018,008
33 R	4,018,007
163.2	4,018,009
165.71	4,018,010
236	4,018,011
281 R	4,018,012
	4,018,013
295	4,018,574
	4,018,575
309 R	4,018,576
337	4,018,014

CLASS 52

23	4,018,015
36	4,018,016
58	4,018,017
127	4,018,018
239	4,018,019
241	4,018,020
251	4,018,021
398	4,018,022
410	4,018,023
473	4,018,024
590	4,018,025

CLASS 53

37	4,018,026
48	4,018,027
51	4,018,028
59 W	4,018,029
124 B	4,018,030
159	4,018,031
247	4,018,032
381 R	4,018,033
390	4,018,034

CLASS 54

23	4,018,035

CLASS 55

137	4,018,577
138	4,018,578
213	4,018,579
321	4,018,580

CLASS 56

1	4,018,036
16.7	4,018,037
400.12	4,018,038

CLASS 57

23	4,018,039
34 R	4,018,040
77.4	4,018,041
144	4,018,042

CLASS 60

39.16 R	4,018,044
39.27	4,018,043
39.28 R	4,018,045
264	4,018,046
282	4,018,047
	4,018,048
	4,018,049
370	4,018,050
398	4,018,051
414	4,018,052
606	4,018,053

CLASS 61

45 R	4,018,054
53	4,018,055
53.64	4,018,056
88	4,018,057
105	4,018,058

CLASS 62

2	4,018,581
50	4,018,582
55	4,018,059
91	4,018,060
101	4,018,583
125	4,018,061
175	4,018,584
372	4,018,585

CLASS 64

7	4,018,062

CLASS 65

2	4,018,586
17	4,018,587
19	4,018,588
163	Re.29,188
287	4,018,589
348	4,018,590

CLASS 66

90	4,018,063
154 A	4,018,064
208	4,018,065

CLASS 68

5 D	4,018,066
134	4,018,067
175	4,018,068

CLASS 70

395	4,018,069

CLASS 71

23	4,018,591
67	4,018,592
76	4,018,593
97	4,018,594

CLASS 72

19	4,018,070
23	4,018,071
106	4,018,072
199	4,018,073
410	4,018,074
467	4,018,075
481	4,018,076

CLASS 73

1 D	4,018,078
1 R	4,018,077
4 R	4,018,079
15.6	4,018,080
41	4,018,081
67.5 R	4,018,082
70	4,018,083
71.5 R	4,018,084
88 R	4,018,085
119 A	4,018,086
146	4,018,087
151	4,018,088
422 R	4,018,089

CLASS 74

52	4,018,090
89.15	4,018,091
96	4,018,092
126	4,018,093
128	4,018,094
217 B	4,018,095
230.01	4,018,096
467	4,018,097
470	4,018,098
473 R	4,018,099
483 PB	4,018,100
493	4,018,101
501 R	4,018,102
519	4,018,103
531	4,018,104
665 GE	4,018,105
688	4,018,106

CLASS 75

.5 A	4,018,595
.5 AA	4,018,596
58	4,018,597
61	4,018,598
165	4,018,599
169	4,018,600

CLASS 76

41	4,018,107
63	4,018,108
77	4,018,109

CLASS 81

3.1 B	4,018,110
71	4,018,111

CLASS 82

1 C	4,018,112
2 B	4,018,113
20	4,018,114
39	4,018,115

CLASS 83

4	4,018,116
16	4,018,117
167	4,018,118
425.3	4,018,119
529	4,018,120

CLASS 84

1.01	4,018,121
1.03	4,018,122
	4,018,123
1.16	4,018,124
1.19	4,018,125
1.24	4,018,126
1.28	4,018,127
231	4,018,128
294	4,018,129
415	4,018,130
484	4,018,131

CLASS 85

1 L	4,018,132
35	4,018,133

CLASS 90

15 R	4,018,134

CLASS 91

321	4,018,135
420	4,018,136
488	4,018,137
	4,018,138
490	4,018,139

CLASS 92

31	4,018,140
85 A	4,018,141

CLASS 93

35 H	4,018,142
36.3	4,018,143
52	4,018,144

CLASS 96

1 SD	4,018,601
1.5	4,018,602
	4,018,603
1.7	4,018,606
	4,018,607
27 E	4,018,608
29 L	4,018,605
48 R	4,018,604
74	4,018,609
124	4,018,610

CLASS 98

40 D	4,018,160
40 VM	4,018,159

CLASS 99

458	4,018,145

CLASS 100

26	4,018,146
39	4,018,169
45	4,018,147
53	4,018,148
160	4,018,149
231	4,018,150

CLASS 101

40	4,018,151
45	4,018,152
93	4,018,153
93.02	4,018,154
93.33	4,018,155
106	4,018,156
110	4,018,157
132.5	4,018,158
231	4,018,161
473	4,018,162

CLASS 102

23	4,018,163
78	4,018,164

CLASS 104

9	4,018,165

CLASS 105

316	4,018,166

CLASS 106

15 R	4,018,611
39.7	4,018,612
53	4,018,613
57	4,018,614
	4,018,858
69	4,018,615
74	4,018,616
85	4,018,617
90	4,018,618
118	4,018,619

CLASS 108

152	4,018,167

CLASS 110

38	4,018,168

CLASS 111

7	4,018,170

CLASS 112

79 R	4,018,171
215	4,018,172
231	4,018,173
235	4,018,174
254	4,018,175

CLASS 113

1 G	4,018,176
119	4,018,177
121 C	4,018,178

CLASS 114

45	4,018,179
65 R	4,018,180
151	4,018,181

CLASS 116

173	4,018,182

CLASS 118

49	4,018,183
49.1	4,018,184
308	4,018,185
405	4,018,186
658	4,018,187

CLASS 119

28	4,018,188
109	4,018,189

CLASS 123

3	4,018,190
8.45	4,018,191
25 C	4,018,192
30 C	4,018,193
32 C	4,018,194
41.76	4,018,195
75 B	4,018,196
117 D	4,018,197
119 A	4,018,198
127	4,018,199
139 AW	4,018,200
139 E	4,018,201
148 E	4,018,202
182	4,018,203
198 F	4,018,204

CLASS 124

24 R	4,018,205

CLASS 125

11 B	4,018,207
11 CD	4,018,206

CLASS 126

121	4,018,208
	4,018,209
164	4,018,210
270	4,018,211
	4,018,212
271	4,018,213
	4,018,214
	4,018,215
360 R	4,018,216

CLASS 127

37	4,018,620

CLASS 128

1 C	4,018,218
1 R	4,018,217
2.06 A	4,018,219
130	4,018,220
185	4,018,221
216	4,018,222
218 C	4,018,223
276	4,018,224
285	4,018,225
287	4,018,226
303.1	4,018,227
305	4,018,228
326	4,018,229

344 4,018,230
351 4,018,231

CLASS 130

27 T 4,018,232

CLASS 131

17 AC 4,018,233
140 B 4,018,234
236 4,018,235
240 R 4,018,236

CLASS 132

83 R 4,018,237
143 4,018,238

CLASS 134

5 4,018,621
19 4,018,622
21 4,018,623
143 4,018,239
196 4,018,240

CLASS 136

225 4,018,625
233 4,018,624

CLASS 137

14 4,018,241
81 4,018,243
113 4,018,244
270 4,018,245
318 4,018,246
355.18 4,018,242
512.1 4,018,247
514.3 4,018,248
624.11 4,018,249

CLASS 138

140 4,018,250

CLASS 140

112 4,018,251

CLASS 141

45 4,018,252
65 4,018,253

CLASS 144

32 R 4,018,254
34 R 4,018,255
238 4,018,256

CLASS 148

1.5 4,018,626
4,018,627
6.27 4,018,628
9 R 4,018,629
11.5 P 4,018,630
31.5 4,018,631
126 4,018,632
4,018,633
131 4,018,634

CLASS 149

2 4,018,635
19.4 4,018,636
96 4,018,637

CLASS 151

41.72 4,018,257

CLASS 152

208 4,018,258
359 4,018,570

CLASS 156

73.1 4,018,639
86 4,018,640
137 4,018,641
272 4,018,642
297 4,018,643
446 4,018,644
626 4,018,638

CLASS 160

26 4,018,259
327 4,018,260

CLASS 162

76 4,018,645
146 4,018,646
168 R 4,018,647
199 4,018,648

CLASS 164

282 4,018,261

CLASS 165

1 4,018,262
4,018,263
4,018,264
7 4,018,265
12 4,018,266
84 4,018,267
86 4,018,268
105 4,018,269
119 4,018,270
175 4,018,271

CLASS 166

119 4,018,272
120 4,018,273
129 4,018,274
137 4,018,275
183 4,018,276
214 4,018,277
252 4,018,278
258 4,018,279
266 4,018,280
273 4,018,281
278 4,018,282
4,018,283
4,018,284
295 4,018,285
4,018,286

CLASS 172

19 4,018,287
395 4,018,288
713 4,018,289

CLASS 173

49 4,018,290
135 4,018,291
170 4,018,292

CLASS 174

19 4,018,976
24 4,018,977
28 4,018,978
35 C 4,018,979
42 4,018,980
52 R 4,018,981
65 R 4,018,982
135 4,018,983

CLASS 175

4.5 4,018,293

CLASS 178

18 4,018,989

CLASS 179

1 GQ 4,018,992
15 BT 4,018,994
15 BY 4,018,993
79 4,018,995
84 VF 4,018,991
4,018,996
98 4,018,997
103 4,018,998
170 D Re.29,189

CLASS 180

9.5 4,018,295
13 4,018,294
41 4,018,296
54 A 4,018,297
76 4,018,298
91 4,018,299

CLASS 182

178 4,018,300
206 4,018,301

CLASS 184

6.26 4,018,302
4,018,303
7 R 4,018,304
45 R 4,018,305

CLASS 187

6 4,018,306
9 E 4,018,307
17 4,018,308

CLASS 188

72.4 4,018,309
73.3 4,018,310
218 XL 4,018,311
333 4,018,312
343 4,018,313
353 4,018,314

CLASS 191

39 4,018,315

CLASS 192

3.3 4,018,316
36 4,018,317
41 A 4,018,318
53 E 4,018,319
106.2 4,018,320

CLASS 193

25 B 4,018,321
37 4,018,322

CLASS 195

1.8 4,018,649
28 R 4,018,650
103.5 C 4,018,651
103.5 M 4,018,652
127 4,018,653

CLASS 198

347 4,018,324
4,018,325
461 4,018,326
508 4,018,323
723 4,018,327
741 4,018,328
743 4,018,329

CLASS 200

5 A 4,018,999
11 D 4,019,000
34 4,019,001
61.18 4,019,002
61.42 4,019,003
61.43 4,019,004
144 R 4,019,005
4,019,006
148 B 4,019,007
153 SC 4,019,008

CLASS 201

9 4,018,654
40 4,018,655

CLASS 203

11 4,018,656
38 4,018,657

CLASS 204

109 4,018,658
159.24 4,018,659
195 F 4,018,661
195 R 4,018,660
299 R 4,018,662

CLASS 206

106 4,018,330
199 4,018,331
223 4,018,332
343 4,018,333
346 4,018,334
422 4,018,335
460 4,018,336
484 4,018,337
505 4,018,338

CLASS 208

10 4,018,663
11 LE 4,018,664
4,018,665
36 4,018,666
134 4,018,667
139 4,018,668
4,018,669
140 4,018,670
152 4,018,671
216 4,018,672

CLASS 209

5 4,018,673
73 4,018,674
86 4,018,675

CLASS 210

24 4,018,676
33 4,018,677
36 4,018,678
4,018,679
50 4,018,680
66 4,018,681
71 4,018,682
4,018,683
140 4,018,684
141 4,018,685
448 4,018,686
4,018,687

CLASS 211

8 4,018,339
44 4,018,340
59.1 4,018,341

CLASS 214

1 BB 4,018,344
4,018,345
4,018,346
1 BT 4,018,342
1 Q 4,018,343
16 B 4,018,347
17 B 4,018,348
87 4,018,349
140 4,018,350
314 4,018,351
761 4,018,352

CLASS 215

253 4,018,353

CLASS 219

10.55 F 4,019,009
4,019,010
76 Re.29,190
4,019,011
79 4,019,012
98 4,019,013
118 4,019,014
121 EB 4,019,015
125 R 4,019,016
135 4,019,017
137 R 4,019,018
146 4,019,019
302 4,019,020
381 4,019,021
386 4,019,022
400 4,019,023
469 4,019,024

CLASS 220

20 4,018,354
23 4,018,355
220 4,018,356
268 4,018,357

CLASS 221

7 4,018,358
14 4,018,359
310 4,018,360

CLASS 222

5 4,018,361
55 4,018,362
80 4,018,363
190 4,018,364
373 Re.29,184
402.11 4,018,365
412 4,018,366
485 4,018,367

CLASS 223

37 4,018,368
78 4,018,382

CLASS 224

9 4,018,369
25 A 4,018,370
26 R 4,018,371

CLASS 225

2 4,018,372

CLASS 228

44.1 A 4,018,373
121 4,018,374
131 4,018,375
158 4,018,376

CLASS 229

22 Re.29,185
27 4,018,377
31 R 4,018,378

CLASS 232

35 4,018,379

CLASS 235

61.11 E 4,019,026
61.11 R 4,019,025
89 R 4,019,027
92 PD 4,019,029
92 SB 4,019,028
92 SH 4,019,040
105 4,019,030
131 FD 4,019,031
150.5 4,019,032
151.1 4,019,036
151.11 4,019,035
151.3 4,019,034
153 AM 4,019,033
156 4,019,037
181 4,019,038
184 4,019,039

CLASS 237

12.3 C 4,018,380
55 4,018,381

CLASS 239

4 4,018,383
102 4,018,385
200 4,018,386
265.19 4,018,384
405 4,018,387

CLASS 240

1.3 4,019,041
4,019,042
4,019,043
25 4,019,044
41 BM 4,019,045
46.59 4,019,046
54 A 4,019,047

CLASS 241

39 4,018,388
67 4,018,389
82.5 4,018,390
152 A 4,018,391
167 4,018,392
182 4,018,393
200 4,018,394
252 4,018,395
301 4,018,396

CLASS 242

54 A 4,018,397
74.1 4,018,398
107.4 A 4,018,399
4,018,400
118.3 4,018,401
192 4,018,402
198 4,018,403
200 4,018,404

CLASS 244

3.14 4,018,405
98 4,018,406
153 R 4,018,407
4,018,408
161 4,018,409

CLASS 246

5 4,018,410

CLASS 248

49 4,018,411
214 4,018,412
4,018,413
317 4,018,414
381 4,018,415

CLASS 249

62 4,018,416

CLASS 250

199 4,019,048
211 R 4,019,049
222 R 4,019,050
227 4,019,051
274 4,019,052
303 4,019,053
319 4,019,054
324 4,019,055
344 4,019,056
375 4,019,057
376 4,019,058
451 4,019,059
461 R 4,019,060
470 4,019,061
492 R 4,019,062
511 4,018,716
523 4,019,063
543 4,019,064
553 4,019,065
562 4,019,066

CLASS 251

63.5 4,018,417
63.6 4,018,418
65 4,018,419
172 4,018,420

CLASS 252

8.55 C 4,018,689
8.6 4,018,688
62.51 4,018,690
62.54 4,018,691
62.57 4,018,692
64 4,018,693
69 4,018,694
73 4,018,695
89 R 4,018,696
301.1 R 4,018,697
301.4 R 4,018,698
353 4,018,699
389 A 4,018,700
4,018,701
389 R 4,018,702
394 4,018,703
411 R 4,018,704
4,018,705
430 4,018,706
4,018,707
431 C 4,018,708
435 4,018,709
439 4,018,710
455 Z 4,018,711
456 4,018,712
464 4,018,713
465 4,018,714
510 4,018,715
513 4,018,717
522 4,018,718
4,018,719
534 4,018,720

CLASS 254

8 B 4,018,421
134.3 PA 4,018,422
158 4,018,423
187.1 4,018,424

CLASS 256

54 4,018,425

CLASS 259

7 4,018,426
81 R 4,018,427

CLASS 260

2 A 4,018,721
2.3 4,018,722
2.5 AB 4,018,724
2.5 AH 4,018,723
2.5 F 4,018,725
8 4,018,726
13 4,018,727
17 R 4,018,728
4,018,729
17.4 R 4,018,730
23.7 N 4,018,731
27 EV 4,018,733
27 R 4,018,732
29.1 R 4,018,735
29.1 SB 4,018,734
29.2 N 4,018,736
29.6 XA 4,018,737
40 R 4,018,738
59 R 4,018,739
70 A 4,018,740
71 4,018,741
75 N 4,018,742
77.5 AT 4,018,745
77.5 B 4,018,744
77.5 CH 4,018,743
78 A 4,018,749
4,018,750
78 R 4,018,746
4,018,747
4,018,748
112 R 4,018,752
112.5 R 4,018,753
4,018,754
123.5 4,018,755
146 R 4,018,756
205 4,018,751
239 BC 4,018,765
239.5 4,018,757
239.55 R 4,018,774
240.3 4,018,758
243 C 4,018,759
4,018,760
4,018,761
4,018,776
243 R 4,018,762
245 4,018,763
246 R 4,018,764
247.2 A 4,018,767
247.2 B 4,018,766
248 AS 4,018,768
248 NS 4,018,769
251 R 4,018,771
256.4 N 4,018,770
268 BC 4,018,772
268 PH 4,018,773
287 C 4,018,780
293.68 4,018,775
295.5 R 4,018,777
296 AE 4,018,778
296 P 4,018,779
297 B 4,018,781
302 R 4,018,784
306.7 T 4,018,785
4,018,786
306.8 D 4,018,787
307 F 4,018,782
308 R 4,018,788
309.2 4,018,789
4,018,790
314.5 4,018,791
329 S 4,018,792
330.5 4,018,793
332.2 A 4,018,794
340.3 4,018,795
343.2 R 4,018,796
343.3 R 4,018,783
4,018,797
345.2 4,018,798
345.5 4,018,799
347.2 4,018,800
348 R 4,018,801
399 4,018,802
408 4,018,803
410.9 R 4,018,804
413 4,018,805
428.5 4,018,806
439 R 4,018,807
4,018,808
446 4,018,809
465 D 4,018,810
468 D 4,018,812
468 K 4,018,811
471 A 4,018,813
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D2—	351	244,061		128	244,072		23	244,064		193	244,085		93	244,097
		244,062		157	244,073			244,065	D10—	38	244,086	D16—	10	244,089
D6—	37	244,066		164	244,074	D8—	41	244,079	D11—	160	244,087	D19—	35	244,090
	45	244,067		177	244,076		338	244,080	D12—	187	244,088		38	244,091
	47	244,068		179	244,075		347	244,081	D13—	21	244,095	D23—	2	244,092
	63	244,069		186	244,077		351	244,082	D14—	5	244,102	D25—	64	244,093
		244,070		191	244,078		354	244,083		86	244,096		84	244,094
	71	244,071	D7—	15	244,063	D9—	157	244,084						

D30—	7	244,099												
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1 : 4,018,080	4,018,374	4,018,979	4,018,808	4,018,103	4,019,067
4,018,409	4,018,377	4,018,990	4,018,827	4,018,104	4,019,090
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4,018,534	4,018,396	4,019,011	4,018,865	4,018,167	4,019,127
4,018,535	4,018,400	4,019,016	4,018,892	4,018,192	4,019,150
4 : 4,017,971	4,018,402	4,019,019	4,018,989	4,018,202	4,019,164
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5 : 4,018,540	4,018,430	4,019,109	4,018,854	4,018,299	4,018,166
6 : Re.29,190	4,018,431	4,019,110	4,018,926	4,018,307	4,018,217
4,017,908	4,018,433	4,019,147	11 : 4,018,608	4,018,331	4,018,298
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4,017,913	4,018,453	4,019,156	4,017,912	4,018,357	4,018,316
4,017,917	4,018,459	4,019,159	4,017,914	4,018,364	4,018,327
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PLANT PATENTS

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U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
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